VOL. V FEBRUARY 1954 NO. 2

UNITED STATES ARMED FORCES MEDICAL JOURNAL

Published Monthly by
the Armed Forces Medical Publication Agency
Department of Defense

Editor
COLONEL ROBERT J. BENFORD, *USAF (MC)*

Associate Editors
CAPTAIN BENNETT F. AVERY, *MC, USN*
COLONEL PATRICK I. MCSHANE, *MC, USA*

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1954

THE PRINTING OF THIS PUBLICATION HAS BEEN APPROVED BY
THE DIRECTOR OF THE BUREAU OF THE BUDGET, 23 JAN. 1953

FOREWORD

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal*.

MELVIN A. CASBERG, M. D.,
Assistant Secretary of Defense (Health and Medical).

MAJOR GENERAL GEORGE E. ARMSTRONG,
Surgeon General, United States Army.

REAR ADMIRAL LAMONT PUGH,
Surgeon General, United States Navy.

MAJOR GENERAL HARRY G. ARMSTRONG,
Surgeon General, United States Air Force.

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. Price 45 cents (single copy). Subscription price
$5.25 a year; $1.35 additional for foreign mailing.

Table of Contents

	Page
Poisonous Fishes and Ichthyosarcotoxism: Their Relationship to the Armed Forces—*Bruce W. Halstead* and *W. M. Lively, Jr.*	157
The Withdrawal Effects of Cortisone in the Therapy of Rheumatic Fever in Young Adults—*Robert S. Daniels, Gasper A. Gulotta,* and *Wesley L. Peterson*	176
Hyperthyroidism Treated With Iodine-131—*Elmer R. King, Luther W. Brady, Jr., Harold A. Sparks, Jr., Malcolm W. Mason,* and *Bartholomew W. Hogan*	186
The Naval Psychologist in the Far East Command—*George A. W. Stouffer, Jr.,* and *Allen E. McMichael*	196
Doctor-Patient Relationship in the Army—*Francis W. Pruitt*	201
The Clinical Use of Succinylcholine as a Muscle Relaxant—*Charles F. Moller* and *William A. Weiss*	212
Medical Considerations in Helicopter Evacuation—*Spurgeon H. Neel, Jr.*	220
Intra-Arterial Transfusion—*Sam F. Seeley*	229
Acute Anterior Poliomyelitis in the Navy—*Sidney A. Britten*	235
Air Embolism as a Result of Submarine Escape Training—*Jack L. Kinsey*	243
CASE REPORTS	
Roentgenographically Demonstrable Appendiceal Calculi—*Philip E. Gedeon* and *John J. Schwab*	256
Phenylbutazone Toxicity—*Irvin M. Becker* and *Martin C. Shea*	259
Cystic Adult Teratoma of the Testis Associated With Failure of the Urogenital Union—*Anthony A. Borski* and *James C. Kimbrough*	266
Torsion of a Parovarian Cyst Complicating Pregnancy—*Harold Pescovitz* and *Thomas A. Noone*	268
Familial Periodic Paralysis—*Morton H. Rachelson*	271
DEPARTMENTS	
Aero Medical Association Observes Silver Jubilee 29-31 March 1954	277
Deaths	280
Official Decorations	281
A Message From the A. M. A.	283
Regular Medical Corps Officers Certified by Specialty Boards	285
Publications by Officers of the Medical Services	287
Book Reviews	289
New Books	309

MONTHLY MESSAGE

It is with sincere regret that I terminate my position with the Department of Defense for I have a deep respect for the men and women of the armed services who wear our nation's uniform. It has been a rare privilege to work with them.

The members of my staff have been untiring in their efforts and I wish to express my deep appreciation to them for their loyal support and invaluable assistance. I also owe a debt of gratitude to the Surgeons General and their staffs. At all times I was able to rely on their complete understanding and cooperation. It has been my privilege to have as my advisory council six outstanding leaders in civilian health and medical fields. They have given generously of their time, and were always available to discuss and advise on the complex problems with which I was confronted. Whatever success I may have had during the past two years is due primarily to the combined efforts of my staff, the Surgeons General, and the advisory council.

Though I leave Washington with real regret, I depart with the assurance that continued progress will be made in the health and medical fields under the most capable guidance of Dr. Frank Brown Berry, a sincere and loyal supporter of the military services. Dr. Berry has had extensive experience in both civilian and military medicine, having served in World Wars I and II and, subsequently, as a consultant to the Surgeon General of the Army. Dr. Berry has held a Reserve commission in the Medical Corps of the Army and was retired recently as a Brigadier General. He has numerous important affiliations in civilian medicine, and has resigned as Professor of Clinical Surgery at Columbia University to accept the position as Assistant Secretary of Defense (Health and Medical). During the past two months every effort has been made to brief Dr. Berry thoroughly on the various projects which are currently under study and I am confident that he will assume the office with a broad knowledge of the problems facing the medical services of the three military departments.

Both to Dr. Berry and to the personnel of the armed services, I extend my very best wishes for continued success in the fulfillment of the medical mission.

Melvin A. Casberg

MELVIN A. CASBERG, M. D.
Assistant Secretary of Defense
(Health and Medical)

POISONOUS FISHES AND ICHTHYOSARCOTOXISM

Their Relationship to the Armed Forces

BRUCE W. HALSTEAD, *M. D.*
W. M. LIVELY, Jr., *M. D.*

THE danger of serious illness or death resulting from fish poisoning is emphasized again by an outbreak that occurred on 21 March 1953 among a number of naval Mid-Pacific contract personnel at the Kwajalein Naval Base in the Marshall Islands, following ingestion of a black moray eel. Five of the victims became violently ill and a sixth died, terminating an illness of about five weeks. The clinical details of this incident and a preliminary analysis of the toxins involved are discussed elsewhere.[1] This recent outbreak was similar to that of moray eel poisoning which involved 57 Filipino contract workers on Saipan on 8 May 1949.[2] The more striking symptoms in these patients consisted of ataxia, paralyses, numbness of the limbs, aphonia, laryngeal spasm, violent convulsions, and coma. In the Saipan outbreak, two of the victims died despite excellent medical care.

According to reports received from Japanese sources, more than 400 military persons succumbed to fish poisoning in Micronesia during World War II. Because of these intoxications the Japanese Navy requested the Nissan Fisheries Institute of Odawara, Japan, to conduct a survey of the poisonous fishes of Micronesia. The study was accomplished by Dr. Yoshio Hiyama of the Tokyo University. The final results were published in the form of both civilian and military handbooks.[3] All of the Japanese editions were profusely illustrated in color.

During 1944-1945, the United States Military Government at Saipan established the post of fish commissioner. It was the duty of this office to develop a fisheries program to provide our armed services in the Mariana Islands with fresh fish at the rate of 35 pounds per 100 rations per week. As the result of this

From the School of Tropical and Preventive Medicine, College of Medical Evangelists, Loma Linda, Calif.

This investigation was supported by a research grant from the Division of Research Grants and Fellowships, the National Institutes of Health, U. S. Public Health Service.

program and the fishing experiences of individual military personnel, it was found that numerous species of commercially valuable fishes were toxic. On 21 June 1945, Rear Admiral F. E. M. Whiting, issued a directive which listed the following fishes as poisonous: barracuda, brown surgeonfish, puffers, pompano, horse mackerel, butterfly fish, red snapper, sea bass, perch, moonfish, triggerfish, and parrot fish. Moreover, it was required that all fishes taken by private fishing parties be inspected by the fish commissioner. Despite these precautions intoxications occurred. Vonfraenkel and Krick[4] and Cohen and associates[5] reported outbreaks involving 30 and 51 persons, respectively. Numerous other cases were said to have occurred which did not appear in the literature.[6]

During 1943, Dr. Wilbert McLeod Chapman of the United States Board of Economic Warfare visited bases throughout the tropical Pacific for the purpose of establishing a fisheries program on a semicommercial scale to provide a fresh fish supplement to the diet of military personnel stationed in these areas. He[7] found that they were continually harassed by the ever-present threat of fish poisoning. During December to February in certain regions in New Caledonia all carnivorous fishes were considered to be dangerous to eat and, in the Ellice Islands, a particular species would be poisonous in one area and harmless in another. The conflicting and frequently erroneous information supplied by natives complicated the problem.

Dr. Leonard P. Schultz,[8] Curator of Fishes, U. S. National Museum, stated that he was frequently consulted by various branches of the armed services for data regarding poisonous fishes. It is an incontestable fact that wherever our forces were stationed in the Indo-Pacific, epidemics of fish poisoning occurred. All too frequently these intoxications were confused with other types of bacterial food poisoning.

Additional information regarding the relationship of poisonous fishes and the military may be found in references 9 through 34. Fish and Cobb[35] prepared an excellent review of the entire subject of noxious marine animals and their relationship to military personnel but, unfortunately, it has not been published. Handbooks and directives, too numerous to list, have issued scores of warnings, recommendations, and advice of sundry kinds but, despite these admonitions and numerous outbreaks among military personnel, the hazards of eating poisonous fishes are frequently underrated.

EPIDEMIOLOGY

Poisonous fishes are widely distributed throughout all warm seas, but are particularly numerous around certain island areas

in the Caribbean, Central, and South Pacific Oceans. It has been estimated that there are about 300 species of poisonous fishes in the Central Pacific. Jensen,[36,37] Boje,[38] and Hjortland[39] reported some of the arctic sharks to be poisonous. The total poisonous fish population of the world is undoubtedly considerably higher because additional poisonous species are continually being added to the list. In a random series of 93 fish species captured in the Phoenix Islands, 29 percent were found to be toxic.[40] In a similar series of 60 species captured at the Johnston Island Air Force Base it was demonstrated that 75 percent of the species were toxic.[41] Fish poisoning at Johnston, Line, and Midway Islands is believed to have been part of a general outbreak which apparently started in that area about 1943. Prior to that time poisonous fishes, aside from puffers and other plectognaths, were unknown. Whether this is something new or a cyclic phenomenon remains to be determined. There is no evidence to indicate that any given species of fish, exclusive of puffers, is inherently toxic or toxic all of the time. Apparently a fish becomes poisonous as a result of its food habits. It is believed that the toxic food cycle is initiated by a marine plant of some type. The validity of this theory is now under investigation. Any reef or shore fish is potentially poisonous if captured in an endemic area. Unfortunately, the exact geographic boundaries of these areas are unknown. Moreover, a commercially valuable species in one area may be deadly poisonous in another. The bulk of the research conducted thus far has been devoted to determining the species identification of the disease agents and their geographic distribution.

Reports regarding the seasonal incidence of the disease are conflicting. A few species, such as barracuda and puffer, appear to be more toxic during the reproductive season of the year, but apparently this is not true of most other fishes. Existing records reveal that fish poisoning may occur during any season of the year. Most puffer species are poisonous about 90 percent of the time, and particularly so during their reproductive period. Ingestion of an ounce of the liver or flesh of some puffers has been known to kill a person within 17 to 20 minutes. In general, the visceral organs of a fish, viz., liver, intestines, and roe, are more likely to be toxic than the musculature, and should never be eaten. Because of the paucity of reliable date, epidemiologic studies will of necessity have to continue for some years to come.

A partial list of the fishes most frequently found to be toxic appears in table 1. The list is grossly incomplete and has been provided merely to give the reader some idea of the phylogenetic extent of toxic fishes.

TABLE 1. *A partial representative list of fishes known to be poisonous*

Family and scientific name	Common name*	
	English	Hawaiian
ACANTHURIDAE *Ctenochaetus strigosus* (Bennett), fig. 1	Surgeonfish	Maií
BALISTIDAE *Balistoides niger* (Bonnaterre), fig. 2	Triggerfish	Humu-humu
CARANGIDAE *Caranx sexfasciatus* (Quoy and Gaimard), fig. 3	Pompano	Ulua
DIODONTIDAE *Diodon hystrix* (Linnaeus), fig. 4	Porcupine fish	O'opu okala
LABRIDAE *Coris gaimardi* (Quoy and Gaimard), fig. 5	Wrasse	Hinaleas
LUTJANIDAE *Lutjanus vaigiensis* (Quoy and Gaimard), fig. 6	Snapper	Uku
MONACANTHIDAE *Alutera scripta* (Osbeck), fig. 7	Filefish	Oili
MULLIDAE *Parupeneus trifasciatus* (Lacépède), fig. 8	Surmullet, goatfish	Weke

TABLE 1. *A partial representative list of fishes known to be poisonous*—Continued

Family and scientific name	Common name*	
	English	Hawaiian
MURAENIDAE *Gymnothorax javanicus* (Bleeker), fig. 9	Moray eel	Puhi
SCARIDAE *Scarus microrhinus* (Bleeker), fig. 10	Parrot fish	Panuhunuhu
SERRANIDAE *Cephalopholis argus* (Bloch), fig. 11	Sea bass, grouper	Hapu'upu'u
SPHYRAENIDAE *Sphyraena barracuda* (Bloch and Schneider), fig. 12	Barracuda	Kaku
TETRAODONTIDAE *Arothron hispidus* (Linnaeus), fig. 13	Puffer	Maki-Maki

*Because most of these fishes are common throughout the tropical Pacific, both English and Hawaiian names are given.

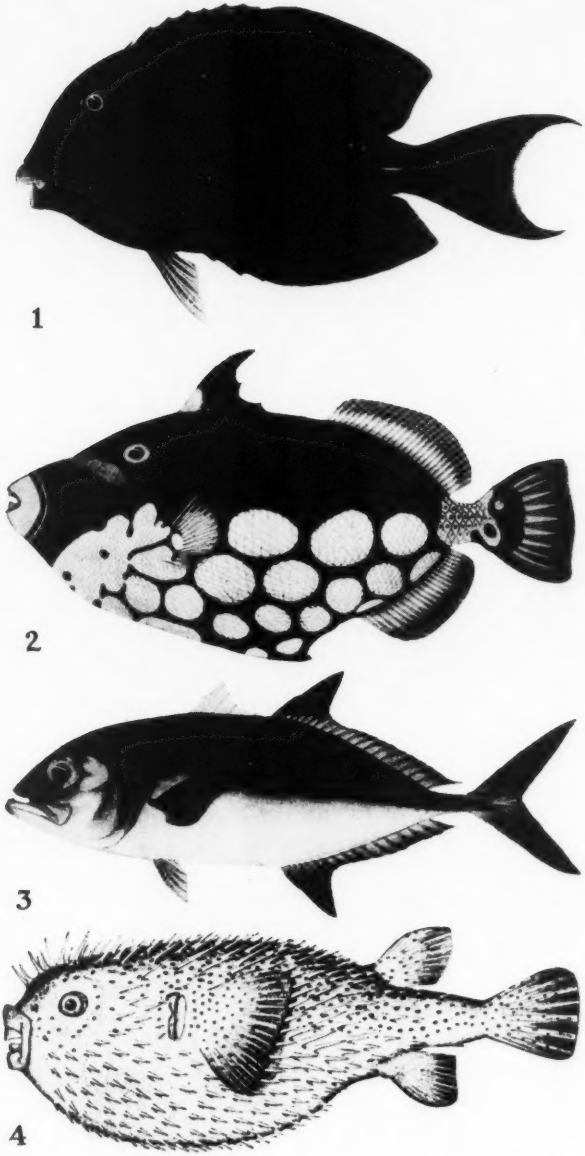


Figure 1. Surgeonfish *(Ctenochaetus strigosus)*. Figure 2. Triggerfish *(Balistoides niger)*. Figure 3. Pompano *(Caranx sexfasciatus)*. Figure 4. Porcupine fish *(Diodon hystrix)*.

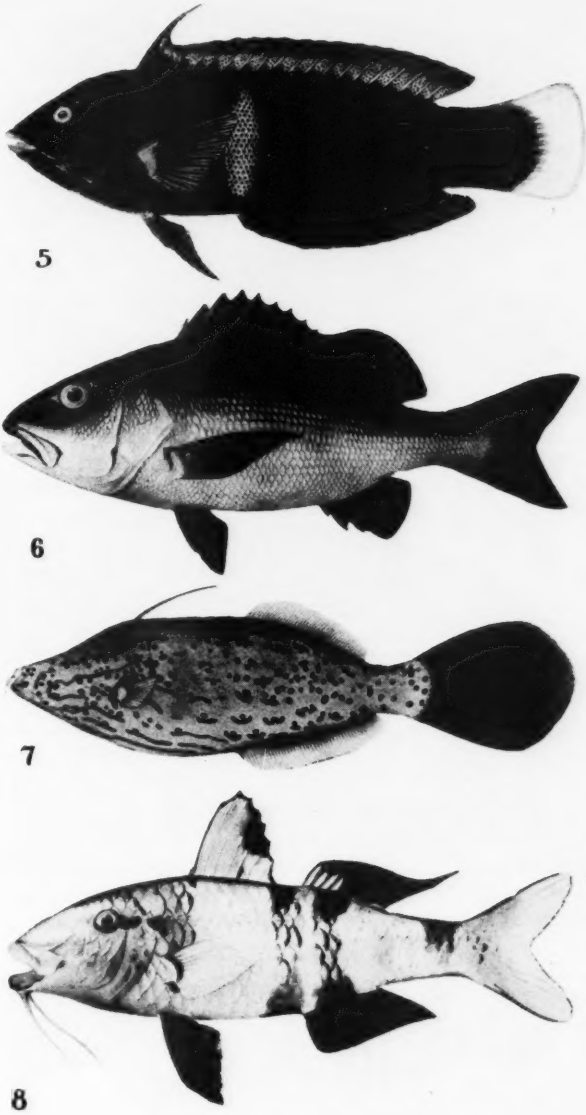


Figure 5. Wrasse *(Coris gaimardi)*. Figure 6. Red snapper *(Lutjanus vaigiensis)*. Figure 7. Filefish *(Alutera scripta)*. Figure 8. Surmullet, or goatfish *(Parupeneus trifasciatus)*.

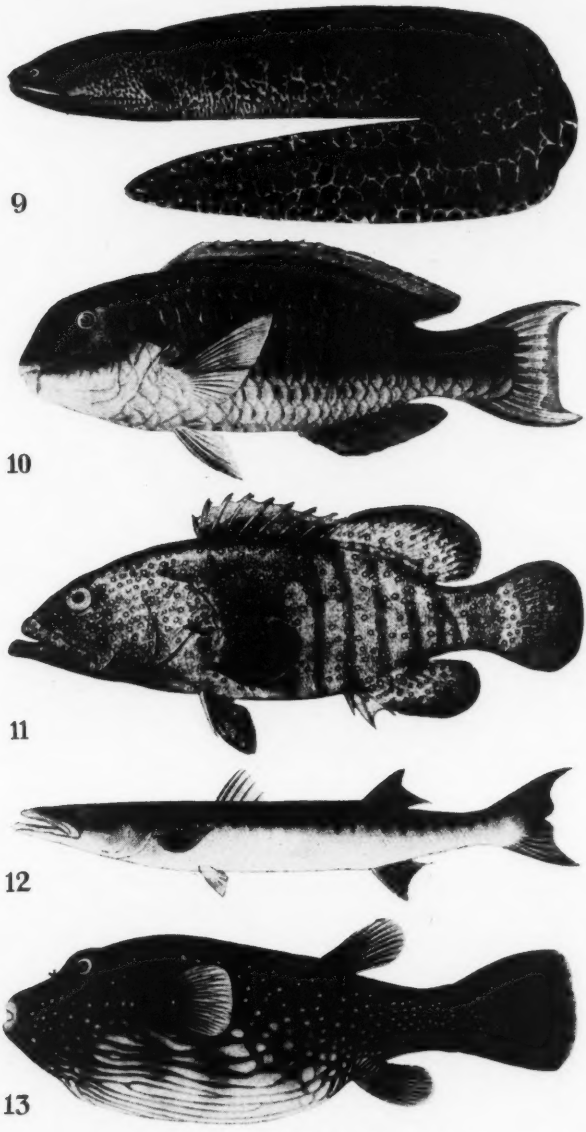


Figure 9. Moray eel *(Gymnothorax javanicus)*. Figure 10. Parrot fish *(Scarus microrhinus)*. Figure 11. Sea bass, or grouper *(Cephalopholis argus)*. Figure 12. Barracuda *(Sphyraena barracuda)*. Figure 13. Puffer *(Arothron hispidus)*.

NATURE OF ICHTHYOSARCOTOXINS

The chemical and pharmacologic properites of most ichthyosarcotoxins, fish poisons, are unknown. Tetraodontoxin or puffer poison has been studied to some extent by the Japanese. Puffer poison, in its purified state, is a white hygroscopic powder, readily soluble in water and insoluble in the ordinary organic solvents. Tetraodontoxin has been assigned the provisional chemical formula of C_{16} H_{31} NO_{16}. Japanese scientists are of the opinion that tetraodontoxin is neither a protein, an alkaloid, nor a protamine. The exact chemical structure and source of the poison are still unknown. Moreover, it is not known whether the ichthyosarcotoxins that are found in such fishes as the snapper, grouper, and moray eel are related to puffer poison, or whether they are a different compound. Most fish poisons (exclusive of puffer poison) appear to have a composite physiologic action on humans. Many of the symptoms are similar in nature to those produced by such compounds as aconitine, muscarine, and curare. Whether or not ordinary fish toxins are true alkaloids remains to be seen. These fish toxins are water soluble and relatively heat stable. Ordinary cooking procedures do not destroy or appreciably alter the virulence of the poison. The state of freshness of the fish has no bearing on the production nor the virulence of the toxin because putrefaction is not a contributing factor in this disease.

CLINICAL CHARACTERISTICS

Clinically, fish poisoning can be divided into four types. The relationship of these types to each other is not clearly understood and the terminology by which they are designated is subject to change.

1. *Tetraodon (puffer) poisoning.* The causative agent is a puffer, one of the members of the suborder Tetraodontoidea. Numbness of the lips, tongue, and tips of fingers and toes usually develops within 30 minutes after the ingestion of the toxin. These symptoms may be followed by nausea, vomiting, headache, dizziness, and generalized weakness, to the extent that the patient can no longer stand erect but must lie down. Power of speech becomes impaired and dyspnea is marked. Within two hours, as a rule, the patient suffers complete paralysis with muscles relaxed and body limp, and is unable to speak although he is conscious. Just prior to death the patient lapses into unconsciousness. Death generally occurs in severe cases within 1 to 24 hours as a result of respiratory paralysis. This is by far the most violent and serious type of ichthyosarcotoxism known. The mortality rate is estimated to be about 60 percent. If the patient survives 24 hours, the prognosis is considered to be good.

2. *Gymnothorax (moray eel) poisoning.* The causative agent is one of the members of the genus *Gymnothorax.* Seven species are definitely known to be toxic; they are: *G. buroensis* (Bleeker), *G. flavimarginatus* (Rüppell), *G. javanicus* (Bleeker), *G. meleagris* (Shaw and Nodder), *G. petelli* (Bleeker), *G. pictus* (Ahl), and *G. undulatus* (Lacépède). Symptoms of tingling and numbness about the lips, tongue, hands, and feet usually develop within 20 minutes to 7 or 8 hours after ingestion of the toxin. These symptoms may be followed by nausea, vomiting, laryngeal spasm, aphonia, excessive mucus production, foaming at the mouth, conjunctivitis, paralysis of the respiratory muscles, motor in-co-ordination, violent colonic and tonic convulsions, abnormal deep and superficial reflexes, and coma. The mortality rate is estimated to be about 10 percent. The excessive mucus production, laryngeal spasm, violent convulsions, and respiratory distress present difficult problems in the handling of these patients. The acute symptoms generally subside within 10 days in the milder forms.

3. *Ciguatera.* This term was originally used to designate fish poisoning, exclusive of puffer poisoning, resulting from the ingestion of fishes in the Caribbean area. However, recent study of the clinical characteristics of the Caribbean and Pacific types of fish poisoning fails to demonstrate any significant differences between them. Since the term ciguatera is well established in the literature it is recommended that this term be used to designate the milder form of ichthyosarcotoxism without reference to geographic location. Numerous species of fishes are capable of producing this type of poisoning (table 1).

Tingling followed by numbness usually develops almost immediately or within a period of 30 hours after ingestion of the toxin. Nausea, vomiting, diarrhea, and abdominal pain are present in about 75 percent of the patients. Joint aches, malaise, chills, fever, prostration, headache, profuse sweating, pruritus, metallic taste, generalized motor in-co-ordination, muscular weakness, and myalgia are common. Sensory disturbances are present in most cases, the patient complaining of hot objects being cold and cold objects as hot or like "electric shock." Convulsions and severe paralyses are less common. Although the mortality rate has been estimated to be only about 2 to 3 percent, complete recovery from the weakness and myalgia sometimes takes weeks or months.

The symptomatology of gymnothorax poisoning apparently differs from ciguatera in both degree of severity and the type of symptoms present. Gymnothorax poisoning develops more rapidly, is more violent, and convulsions and paralyses are prominent. In a typical case of ciguatera the sensory disturbances, myalgia, and extreme weakness are most pronounced.

4. *Scombroid poisoning.* This type of fish poisoning results from eating scombroid or tuna-like fish (tuna, bonito, skipjack, mackerel) in certain tropical regions. It has recently been reported prevalent during the spring months in the Philippine Sea. The symptoms are histamine-like in nature, consisting of severe headache, flushing of the face, congestion of the soft tissues of the eyes, nausea, vomiting, giant urticaria, and erythema. Patients usually recover within a period of eight to 12 hours. Scombroid poisoning differs from ciguatera in that its clinical manifestations are histamine-like, whereas ciguatera produces neurotoxic symptoms.

CASE REPORTS

The first four cases, reported by one of us (W. M. L.) are representative of ciguatera. This particular outbreak occurred on 9 September 1944 at Tarawa, Gilbert Islands, from ingestion of red snapper (exact species is unknown, but probably *Lutjanus vaigiensis, Lutjanus gibbus,* or *Lutjanus bohar*—all are common red snappers having excellent flavor, but frequently toxic). The snapper was captured by an elderly Australian shipmaster who had traveled in and around the islands since 1914 and had bee. brought to Tarawa by the armed services because of his intimate knowledge of the Central Pacific Islands. Moreover, for the preceding 10 months he had been assigned the task of supervising a small fisheries operation for the purpose of supplying the military with fresh fish to eat. The fish was caught at 2100, brought to shore, placed in an electric refrigerator and kept there until it was eaten at 2100 the following night. The meal consisted of fish seasoned with salt and pepper, bread, butter, and coffee with sugar and cream. No other foods were eaten. A number of men in the mess hall ate the bread and butter and drank coffee with cream and sugar, but only the four persons (a U. S. Air Force officer, the Australian shipmaster, and two cooks) who ate the fish became sick. All four ate from the same fish, but ingested varying amounts of it. The more fish each person had eaten, the more acute was his illness.

Case 1. A 29-year-old mess sergeant at about 2100 on the night of 9 September ate a 2- by 1- by 1½-inch piece of the forementioned red snapper. About one hour later he developed weakness, profuse sweating, malaise, chilly sensations, and a griping abdominal pain. There was no nausea or vomiting, oral paresthesia, or pruritus. The feeling of weakness and tiredness became progressively worse until he found it very difficult to walk to the latrine. The patient complained of a very pronounced, heavy, tired feeling in his legs. Because of an extreme feeling of exhaustion he was unable to sleep that night. The next day he noticed that whenever he picked up anything cold, he received a

sensation similar to electricity going through his hand, which after a few seconds became very painful. This temperature disturbance lasted for four days. The patient noticed when he got up and walked about the next day that the peculiar, weak, tired feeling came back into his legs and persisted for some time after he ceased motion. He stated that he had never previously felt so weak, tired, and miserable. The patient was acutely ill for about seven days and continued to feel weak for several days thereafter. No laboratory work was performed and no specific treatment was given.

Case 2. A 25-year-old white mess sergeant also ate a 4- by 4- by ½-inch portion of the same red snapper. About one hour later he complained of a peculiar sensation of heaviness in his throat and had difficulty in drinking water. He later felt dizzy, broke out in a cold sweat, and complained of being chilly. Within a short time he developed a severe griping abdominal pain and had to go to the latrine where he remained for the following two hours, having a profuse watery diarrhea. The frequent bowel movements resulted in the patient's rectum becoming raw and painful. There was no nausea or vomiting. During the diarrheal bout the patient began to develop a peculiar dull type of pain in his arms and legs which was aggravated by walking but persisted during rest. The patient stated that he was unable to find comfort no matter what position he took. Extreme exhaustion, weakness, and generalized malaise were the chief complaints at this time. The following morning when he walked he developed the same dull, aching pain in his legs and again it persisted for about 20 minutes after motion had ceased. These leg pains continued for about four days and then gradually subsided. About this time he noticed that whenever he came in contact with a cold object he received a sensation of pins and needles sticking him; a cold shower became a very painful experience. Ice cold objects felt like an electric shock and after a few seconds he was unable to hold the object in his hand. The temperature disturbance continued to be severe for about six days and was present in a mild form for another four days. The patient was acutely ill for seven days and felt very weak for 14 days. Temperature, pulse, and respiration were not affected. Aside from a single injection of morphine to relieve the myalgia on the evening of the first day, no other treatment was administered. No laboratory work was done.

Case 3. A 56-year-old Australian shipmaster ate three small pieces of the forementioned red snapper. About one hour later he noticed a prickly sensation in his mouth when he drank ice water. Ordinary tap water tasted flat and peculiar, but did not elicit the paresthesia. Within a half hour after eating the fish

he developed a diarrhea, having a bowel movement every few minutes for a period of three hours, which left the patient weak and exhausted. There was no nausea or vomiting. The patient developed a generalized malaise and myalgia which made it difficult for him to sit or lie in a comfortable position. Weakness and exhaustion were extreme. About two hours after eating the fish the patient developed the same type of temperature disturbance as in the first two cases. This disturbance lasted for about 14 days. A cool breeze at night would cause a tingling and prickly sensation about his mouth, lips, and body. The patient felt chilly for a period of about two weeks. About four to six hours after eating the fish, the patient developed an intense itching all over his body. When he was awake he was able to refrain from scratching, but when he was asleep he would scratch until he abrased the skin. The pruritus would subside for awhile but anything that would cause him to sweat would start it again. The itching continued to be severe for about 21 days and then gradually disappeared. For about three days the patient had the continual urge to urinate, but whenever he went to the latrine, he was able to void only a few drops. The patient hiccuped almost constantly for four days, a process which greatly exhausted him. He remained on quarters for about 14 days, but it was 21 days before he had sufficient strength to do even light tasks. During this time he lost about 10 pounds of weight. The patient had difficulty in sleeping for a period of about one month. Temperature, pulse, and respiration did not appear to be affected. Laboratory work consisted of a single urinalysis which demonstrated a one plus sugar, but this was not considered to be significant. The patient was given a single parenteral feeding of saline and dextrose on the second day. No other data was available regarding treatment.

Case 4. A 36-year-old Air Force officer ate seven pieces of the forementioned red snapper. About an hour later the patient noticed a prickling sensation in his throat and mouth that tended to increase in intensity. About 30 minutes later, the patient developed a griping pain in his abdomen, went to the latrine several times, and finally remained there for a period of four hours because of a violent diarrhea. During this period he had a "heavy sensation" in his arms and legs, which was described as feeling similar to the type experienced in walking through deep snow for several hours, but many times worse. There was also a feeling of extreme weakness, exhaustion, and myalgia such as was described by the other victims. Resting did not relieve these feelings since there was no position that he could attain which would bring about relief. The chilly sensation and temperature disturbance which has been previously described in the other cases, were also

285934 O—54——2

present. Nausea and vomiting were absent. An attempt to elicit vomiting was ineffective. About four hours after eating the fish an intense pruritus developed which became progressively worse and prevented any satisfactory rest. The patient was acutely ill and so obviously miserable that the medical officer gave him an injection of morphine which provided some relief and sleep.

The next morning the dull pain that had been present the previous evening returned, affecting the stomach, arms, and legs. The pain was described as a continuous, heavy, dull sensation that became progressively worse. It was observed that with a little movement the pain in his legs increased markedly above the level at which it had previously been when at rest, and that it persisted for about 20 minutes after movement had ceased. Sixty milligrams of codeine and 0.6 gram of aspirin had no effect on the pain. Activity, such as holding a magazine up to read, would so increase the pain in the arms during the first five days that the patient would have to lay the magazine down. The pain was continuously present in the stomach, arms, and legs during the first six days, except when morphine was administered (which was once a day). The pain would then completely disappear for from eight to 10 hours after the injection. On the afternoon of the third day, the patient complained of his teeth aching. On the second and fifth days, the patient tried to eliminate the morphine and took 60 mg. of codeine and 2 grams of aspirin, but with no relief from pain. On the seventh day, the patient took six ounces of whisky in an effort to eliminate the morphine and the pain, but this only aggravated the myalgia. By the fourteenth day, the pain had subsided to the extent that 0.6 gram of aspirin and 0.4 gram of pentobarbital would permit sleep. During this time the patient was steadily losing weight, finally resulting in a loss of 25 pounds. At any time up to the twenty-second day, walking would bring about a recurrence of the pain. The temperature disturbance continued for about 28 days, and the pruritus continued relentlessly until the thirty-fifth day. Then gradually these symptoms subsided. Extreme weakness, myalgia, and joint aches of both shoulders persisted throughout the sixth week. The patient required a barbiturate each night through the eighth week. Temperature, pulse, and respiration did not appear affected. Subsequent contact with the patient revealed that it was necessary for him to keep physical exertion to a minimum for many months.

Because this outbreak took place at Tarawa when field conditions were very primitive and medical facilities were at a premium, the medical work-up was incomplete.

OTHER OUTBREAKS

Report 1. Captain John T. Martin,[42] USAF (MC), formerly Base Surgeon, 1505 Air Base Group, Johnston Island, reported a noncommissioned officer and his family who were poisoned as a result of ingesting a black skipjack, which according to the description given, was probably *Euthynnus yaito* (Kishinouye). The fish was captured in the vicinity of the northern peripheral reef at Johnston Island during the latter part of August 1950.

The fish was taken home, cleaned, and cooked within a short time after capture, so there was no opportunity for spoilage. Neighbors stated that they had captured this same species of black skipjack on previous occasions and had eaten it without ill effect. Members of the family eating the fish consisted of the husband, his wife, and two children. A few hours after the meal, all of the members of the family developed nausea and vomiting, tingling and numbness of the lips, mouth, and extremities, clammy skin, mild diarrhea, intestinal cramps, weakness, myalgia, palpitation, and mild to moderately severe prostration. The acute phase of the episode lasted about 36 hours and then gradually the symptoms subsided. The convalescent period was slow, lasting for several weeks, during which time weakness and myalgia of the legs were the predominant symptoms present. Treatment consisted of bed rest and symptomatic relief during the acute stage. Nicotinic acid was used with the hope of relieving the peripheral neuritis, but it proved to be ineffective. Within a period of two months the family had completely recovered. The family cat also ate a liberal portion of the fish and became very ill, afflicted with vomiting and diarrhea, but appeared to have recovered within a period of 24 hours.

During the period from May 1950 to May 1951 there were said to be about 20 cases of ichthyosarcotoxism at Johnston Air Force Base.

Report 2. Mr. Allen I. Lewis[43] of Contoocook, N. H., reported an outbreak of fish poisoning which occurred at Palmyra, Line Islands, in August 1944, while he was stationed on the island with the U. S. Navy. The causative fish was a red snapper (probably *L. vaigiensis, L. gibbus,* or *L. bohar)* which had been captured off the southwest tip of the island, near Sand Islet, in the vicinity of the boat channel. About 50 fish were served at mess that evening, but only the fish served at one table proved to be poisonous. In this instance all six of the persons became sick.

About four hours after eating the fish, the symptoms, consisting of tautness and tingling of the skin, dryness of the mouth, dizziness and diarrhea, began to develop. There was no nausea or vomiting. The following morning one of the victims drank some ice

water and noticed that it tasted odd, seemed to "stick in his throat," and felt warm instead of cold. One of the group recovered within a period of about 24 hours, but the remainder were acutely ill for several days and then gradually recovered. No information was available regarding treatment.

Report 3. The following data was obtained from the files of Miss Margaret Titcomb, Librarian of the Bernice P. Bishop Museum, regarding three separate outbreaks of fish poisoning which occurred at the U. S. Naval Air Station at Palmyra Island. The original report from which the accounts are quoted was prepared by Lieutenant, junior grade, W. J. McCann, Jr., MC, USNR, on 12 December 1946. The causative fish in each of these cases was red snapper, exact species undetermined.

"On 13 November 1946, five men reported to morning sick call stating that they had been poisoned by eating fish the previous night. Their history is as follows: Fish were caught outside of the reef, killed, cleaned, and eaten promptly. Within a few minutes of eating the fish they noticed a peculiar burning sensation in their throats. This was followed in about three hours by nausea, vomiting, and abdominal cramps. Vomiting gradually diminished and diarrhea began, lasting approximately five hours. About this time, eight hours after ingesting the fish, they noticed a numbness or tingling sensation which some described as burning of hands and feet associated with moderate motor paralysis of these areas. In addition, one man complained of 'stiffness of the face' and 'tight skin over the face.' All complained of vague migratory arthralgia and myalgia along with headache and generalized malaise. One man experienced an attack of syncope related to respiratory embarrassment with evidence of rapid, labored, shallow respiration. All five men stated that cold water, either in the form of showers or drink, caused 'electric shock-like feelings' to go through their bodies. These men were not seen by a medical officer until the morning when the course of the disease was about nine hours old. It was too late for emetics but each man was given a cathartic, put to bed, and given a fluid diet and sedatives. On the second day, two of the men were restored to duty with light assignments and no recurrence of symptoms. On the third day, the remaining men were restored to duty, but of this group, one man, the one who complained of 'facial stiffness,' still complained of peripheral weakness and was given 50 mg. of thiamine hydrochloride orally per day. By the end of the week, all five men were fully recovered."

"On 6 January 1945, a man was evacuated from a merchant ship after having eaten raw red snapper. While the patient was not acutely ill, he had symptoms of gastroenteritis. No evidence of neural involvement was noted."

"On 1 February 1945, 12 members of the crew of a merchant ship were brought ashore suffering from fish poisoning after eating red snapper caught off shore from Palmyra. The men were extremely ill. All patients were given an emetic, sedation, and soda enemas. It was necessary to give five of the men nikethamide (coramine). All survived and were returned to their ship in a few days."

TREATMENT

An attack of fish poisoning does not impart immunity and there is no known specific antidote. The treatment is purely symptomatic. Gastric lavage and catharsis should be instituted at the earliest possible time. In many instances 10 percent calcium gluconate given intravenously has given prompt relief while in others it has been ineffective. Victims suffering from moray eel poisoning appear to be particularly susceptible to violent convulsions and may present difficult nursing problems. Because the convulsions are precipitated by noise, rest, quiet, and sedation are essential. Paraldehyde and ether inhalation have been reported to be effective in controlling the convulsions. Nikethamide or one of the other respiratory stimulants is advisable in cases of respiratory depression. In patients where excessive production of mucus is a factor, aspiration and constant turning are essential. Atropine has been found to make the mucus more viscid and difficult to aspirate, and is not recommended. If laryngeal spasm is present, intubation and tracheotomy may be necessary. Oxygen by inhalation and intravenous administration of fluids supplemented with vitamins given parenterally are usually beneficial. If the pain is severe, opiates will probably be required. Morphine given in small divided doses has been recommended. Cool showers have been found to be effective in relieving the severe itching. Fluids given to patients suffering from the paradoxical sensory disturbance (temperature upset) should be slightly warm or at room temperature. Vitamin B complex supplements are advisable.

IDENTIFICATION OF POISONOUS FISHES

Native peoples have numerous methods by which they attempt to distinguish a poisonous fish from an edible one. The significance of silver coins, color of the fish, condition of the gills, and position of the scales, *ad infinitum,* is generally based on local superstition rather than on scientific fact. One cannot detect a poisonous fish by its appearance. Moreover, there is no known simple chemical test to determine the edibility of a fish. The most reliable methods involve the preparation of tissue extracts which are injected intraperitoneally into mice, or feeding samples of the viscera and flesh to cats or dogs. Viscera (liver,

intestines, and roe) should never under any circumstances be eaten.

SUMMARY

Poisonous fishes, which are endemic to all warm seas, constitute a serious hazard to military personnel. Numerous outbreaks of intoxication and deaths involving military persons have been reported. Ichthyosarcotoxism is comprised of four clinically distinct types: tetraodon, gymnothorax, scombroid, and ciguatera. They appear to vary in severity, types of symptoms, and species of fish. The disease can be defined as a type of intoxication resulting from the ingestion of a neurotoxin which is present in the bodies of certain fishes, and variously manifested by symptoms of extreme weakness, malaise, pruritus, myalgia, paresthesias of the mouth and extremities, paralyses, and convulsions, generally associated with such gastrointestinal symptoms as nausea, vomiting, diarrhea, and abdominal pain. Death, when it occurs, is from respiratory paralysis. The treatment is symptomatic. A poisonous fish cannot be recognized by its appearance. The public health and military significance of this disease is grossly underestimated and is worthy of much greater attention than it has received.

REFERENCES

1. Ralls, R. J., and Halstead, B. W.: Moray eel poisoning and preliminary report on action of toxin. In press.

2. Khlentzos, C. T.: Seventeen cases of poisoning due to ingestion of eel. Gymnothorax flavimarginatus. *Am. J. Trop. Med.* 30: 785-793, Sept. 1950.

3. Hiyama, Y.: *Report of Investigation of Poisonous Fishes of the South Seas.* Nissan Fisheries Experiment Station, Odawara, Japan, Feb. 1943. English translation: U. S. Fish and Wildlife Service, Special Scientific Report: *Fisheries* 25: 1-188 (Japanese Navy Survival Manuals were abridged editions of this work.)

4. Vonfraenkel, P. H., and Krick, E. S.: Fish poisoning by barracuda in Marianas. *U. S. Nav. M. Bull.* 44: 427-431, Feb. 1945.

5. Cohen, S. C.; Emert, J. T.; and Goss, C. C.: Poisoning by barracuda-like fish in Marianas. *U. S. Nav. M. Bull.* 46: 311-317, Feb. 1946.

6. Taggert, G. M. (Formerly, Fish Commissioner for Military Government at Saipan; presently of Okinawa): Personal communication.

7. Chapman, W. L. (Presently, Director of Research, American Tunaboat Association, San Diego, Calif.): Personal communication.

8. Schultz, L. P.: Personal communication.

9. Bureau of Medicine and Surgery, Department of the Navy: *Epidemiology of Diseases of Military Importance in Netherlands Indies.* NavMed 133. U. S. Government Printing Office, Washington, D. C., 1944. pp. 142-143.

10. *Military Government Handbook, Marshall Islands.* OPNAV P22-1. Aug. 1943. p. 95.

11. Bureau of Medicine and Surgery, Department of the Navy. *Compilation on Diseases of Naval Importance in Micronesia.* Navmed 211. 1944. pp. 51-52.

12. Bureau of Medicine and Surgery, Department of the Navy: *Epidemiology of Diseases of Naval Importance in Formosa.* NavMed 266, 1944. pp. 50-51.

13. Notes on Tropical Diseases for Air Force Medical Officers. Arctic, Desert, and Tropical Branch, A. A. F. Tactical Center 4: 14-16, 1944.

14. Poisonous fish in Marshall Islands. (News and Comment Sec.) *Bull. U. S. Army M. Dept.* 76: 32-33, May 1944.

15. Office of Naval Intelligence, Department of the Navy: *Survival on Land and Sea.* 1944. pp. 48-52.

16. Bureau of Medicine and Surgery, Department of the Navy: *Epidemiology of Diseases of Naval Importance in China.* NavMed 630. Jan. 26, 1945. p. 102.

17. Bureau of Medicine and Surgery, Department of the Navy: *Epidemiology of Diseases of Naval Importance in Korea.* NavMed P-1289. U. S. Government Printing Office, Washington, D. C., 1948. p. 63.

18. One man's fish is another's poison. *All Hands,* No. 428, 14-17, Oct. 1952.

19. Buddle, R.: Some common poisonous fishes found in Singapore waters. *J. Roy. Nav. M. Serv.* 16: 102-111, Apr. 1930.

20. Clark, E.: Fisherman beware! Fishing for poisonous plectognaths in Western Carolines. *Research Review,* Office of Naval Research, U. S. Navy NAVEXOS P510: 1-6, June 1950.

21. Gilman, R. L. (Philadelphia): Review of fish poisoning in Puerto Rico-Virgin Islands area; report of 10 cases occurring on Culebra Island. *U. S. Nav. M. Bull.* 40: 19-27, Jan. 1942.

22. Gregory, C. R.: Three cases of food poisoning attributed to eating freshly caught fish—yellow jacks. *U. S. Nav. M. Bull.* 23: 316-320, Sept.-Oct. 1925.

23. Halstead, B. W.: Poisonous fish—medical military problem. *Research Review,* Office of Naval Research, Department of the Navy, NAVEXOS P510: 10-16, June 1951.

24. Halstead, B. W.: Ichthyotoxism—neglected medical problem. *Med. Arts & Sc.* 5: 1-7, 1951.

25. Kawakubo, Y., and Kituchi, K.: Testing fish poisons on animals and report of human case of fish poisoning in South Seas. *J. Nav. Med. Sc. (Japan),* 31: 30-34, 1942.

26. Kerr, W. M.: Note on case of fish poisoning in Guam. *U. S. Nav. M. Bull.* 6: 401-402, July 1912.

27. Mann, W. L.: Fish poisoning in Culebra-Virgin Islands area. *U. S. Nav. M. Bull.* 36: 631-634, Oct. 1938.

28. Neilson, J. L.: Report of outbreak of fish poisoning on board U. S. S. *"California." U. S. Nav. M. Bull.* 25: 480-484, Apr. 1927.

29. O'Neill, J. B.: Food poisoning; in First Marine Brigade, Fleet Marine Force, Culebra, P. R. *U. S. Nav. M. Bull.* 36: 629-631, Oct. 1938.

30. Oudard: Intoxication par des poissons en Chine. *Arch. Med. Nav.* 92: 38-47, 1909.

31. Pryor, J. C.: *Naval Hygiene.* P. Blakiston's Son & Co., Philadelphia, Pa., 1918. pp. 309-318.

32. Simmons, J. S.; Whayne, T. F.: Anderson, G. W.; Horack, H. M.; and collaborators: *Global Epidemiology,* Volume I. J. B. Lippincott Co., Philadelphia, Pa., 1944. pp. 44, 80, 113, 135, 148, 160, 178, 224, 238, 249, 260, 274, 290, 307, 319, 355, 365, 418, 432, 455. 464.

33. Spear, R.: Fish poisoning. In Report of the Surgeon General, U. S. Navy, 1904. pp. 283-284.

34. Walker, F. D.: Fish poisoning in the Virgin Islands. *U. S. Nav. M. Bull.* 17: 193-202, Aug. 1922.

35. Fish, C. J., and Cobb, M. C.: Noxious marine animals of the central and western North Pacific. Office of Naval Research, Department of the Navy, Technical Report No. 7, pp. 1-87, Apr. 1949.

36. Jensen, A. S.: Contributions to ichthyofauna of Greenland. *Skrift. Univ. Zool. Mus.* 9: 20-25, 1948.

37. Jensen, A. S.: The selachians of Greenland. *Mindeskrift for Japetus Steenstrup* 30: 12-16, 1914.

38. Boje, O.: Toxin in flesh of Greenland shark. *Meddel om Grønland* 125: 1939.

39. Hjortland: Title unknown. Det Grønlandske Selskabs Aarsskrift, 1917. pp. 47-60.

40. Halstead, B. W., and Bunker, N. C.: A survey of the poisonous fishes of the Phoenix Islands. In press.

41. Halstead, B. W., and Bunker, N. C.: A survey of the poisonous fishes of Johnston Island. In press.

42. Martin, J. T.: Personal communication, 1951.

43. Lewis, A. I.: Personal communication, 1952.

THE WITHDRAWAL EFFECTS OF CORTISONE IN THE THERAPY OF RHEUMATIC FEVER IN YOUNG ADULTS

ROBERT S. DANIELS, *Captain, USAF (MC)*
GASPER A. GULOTTA, *Captain, USAF (MC)*
WESLEY L. PETERSON, *Captain, USAF (MC)*

CORTISONE and pituitary adrenal corticotropin (ACTH) have been used extensively in the treatment of rheumatic fever and rheumatic carditis, but there has been a paucity of literature on the withdrawal effects.

When these hormones are discontinued there may be clinical and laboratory evidence of increased rheumatic activity.[1] Articles written by Massell and Warren,[2] Wilson and Helper,[3] and Massell and associates[4] gave brief mention to withdrawal effects of corticoid therapy. Ziegra and Kuttner[5] treated 16 children with cortisone and ACTH. One of their patients showed no withdrawal effect, 14 showed laboratory evidence only, and one showed clinical signs of withdrawal. These findings subsided within three weeks after therapy was discontinued. Taran and Gulotta[6] studied 41 rheumatic children and showed that 61 percent had withdrawal effects. These were observed more commonly after cortisone than after ACTH. The greater the degree of carditis prior to the institution of therapy, the more severe were the withdrawal effects. Their conclusions were: "This preliminary study points up the observation that the so-called rebound phenomenon is not inconsequential, and in some instances must be looked upon with grave concern."

MATERIALS AND METHODS

Twelve patients from 17 to 21 years of age were admitted to this hospital with a diagnosis of acute rheumatic fever, fulfilling the diagnostic criteria of Jones.[7] Treatment consisted of intramuscular injection of a total of 3.1625 grams of cortisone in 28 days in the following single daily doses: 300 mg. for three

From U. S. Air Force Hospital, Francis E. Warren Air Force Base, Wyo.

days, 150 mg. for three days, 100 mg. for 15 days, 75 mg. for two days, 50 mg. for two days, 25 mg. for two days, and 12.5 mg. for one day.

During the treatment period and for two weeks following therapy, patients were on complete bed rest. They received a low salt diet (less than 500 mg. per day) and three grams of potassium chloride daily. Patients were observed daily throughout the study. Erythrocyte sedimentation rates (Wintrobe) were done three times a week and uncorrected values were used. Standard 12 lead electrocardiograms were taken three times per week. Temperatures were taken rectally.

An attempt was made to quantify the severity of the withdrawal effects as done by Taran and Gulotta (table 1). The patients were divided into four groups, from one to four plus, according to severity. The manifestations of withdrawal were divided into two groups, those specific for rheumatic fever (carditis and polyarthritis), and those nonspecific, such as elevation of temperature, elevation of sedimentation rate, increase in pulse rate, and electrocardiographic changes. The former were placed in group three and those with evidence of cardiac failure in group four. A single nonspecific manifestation placed the severity in group one; whereas, two or more place the withdrawal effect in group two.

CASE REPORTS

Case 1. A 19-year-old youth was admitted to this hospital 5 July 1953 with a one-day history of pain in both shoulders, both knees, the right ankle, and in the low lumbar region. On admission, he had objective evidence of polyarthritis, a temperature of 102° F., and electrocardiographic evidence of a nodal rhythm. Three erythrocyte sedimentation rates during the first week of hospitalization were 10, 37, and 36 mm. at the end of the first hour, respectively. Cortisone therapy was initiated on 12 July 1953. During the period of therapy a soft, apical, systolic murmur heard on admission increased slightly in intensity. Laboratory and electrocardiographic abnormalities returned to normal. Cortisone was discontinued on 9 August 1953 and no subsequent withdrawal effects were noted. (Severity of illness, mild; withdrawal effects, none.)

Case 2. A 20-year-old Negro was admitted to this hospital with a history of tenderness and pain in both knees, both thighs, and lumbar back region of two days' duration. Past history revealed previous rheumatic episodes at ages eight and 16 with "murmurs" since the age of eight. Physical examination revealed objective polyarthritis and loud aortic and mitral systolic and

TABLE 1. *Summary of withdrawal effects*

Patient	Time of onset (days)*	Duration	Fever	Tachy-cardia	Elevated sedimen-tation rate	Abnormal ECG	Joints	Develop-ment of diastolic murmur	Severity of with-drawal effects	Severity of illness
1	None								0	Mild
2	-3	Persistent			+					
	-1	6 days	+							
	-2	1 day				+				
	+5	2 days					+		3+	Marked
3	-2	3 days	+						1+	Marked
4	-6	19 days				+				
	-3	Persistent						+		
	+2	1 day	+							
	+4	3 days					+		3+	Marked
5	+3	1 day	+						1+	Mild
6	None								0	Mild
7	+1	17 days		+						
	+3	6 days	+						2+	Mild

TABLE 1. *Summary of withdrawal effects*—Continued

Patient	Time of onset (days)*	Duration	Fever	Tachy-cardia	Elevated sedimen-tation rate	Abnormal ECG	Joints	Develop-ment of diastolic murmur	Severity of with-drawal effects	Severity of illness
8	-3	9 days	+							
	0	13 days			+				2+	Moderate
9	-9	11 days	+							
	-5	3 days			+					
	0	10 days					+		3+	Marked
10	+1	3 days			+				1+	Mild
11	-3	4 days					+		3+	Moderate
12	+1	Persistent						+		
	+6	6 days	+						3+	Moderate
Total			8	1	4	2	4	2		

*Before (-) or after (+) cortisone was discontinued.

diastolic murmurs. The temperature was 102° F., the erythrocyte sedimentation rate was 40 mm. at the end of the first hour, and the electrocardiogram was normal. Serology was negative.

Cortisone was begun 20 June 1953, and shortly after there was dramatic symptomatic improvement and return of temperature and sedimentation rate to normal. The murmurs remained unchanged. Cortisone was discontinued 18 July 1953. On 15 July the sedimentation rate rose to 42 mm. at the end of the first hour and has remained moderately elevated. On 17 July diphasic T waves in leads II and aV_L were noted. On 18 July and for the following six days, the patient had low-grade temperature elevation. On 24 July he developed pain and tenderness in both shoulders. Severity of symptoms necessitated the resumption of cortisone. There were no withdrawal effects following the second course of therapy. (Severity of illness, marked; withdrawal effects, three plus.)

Case 3. This 21-year-old man was admitted to this hospital 8 July 1953 complaining of low back pain of 1 week's duration and pain and tenderness in the right knee of 1 day's duration. The temperature was elevated to 103.4° F. The electrocardiogram showed alternating beats of normal and aberrant ventricular conduction. Cortisone was given from 10 July to 6 August 1953 with symptomatic improvement. The laboratory findings returned to normal. On 4 August 1953 the patient developed temperature elevation to 101.4° F. This persisted for three days. (Severity of illness, marked; withdrawal effects, one plus.)

Case 4. A 21-year-old man was admitted to this hospital 21 June 1953 with a history of pain in the left ankle for 2 weeks and pain in the right ankle, both knees, and the left elbow for 3 days. The patient had objective polyarthritis, a temperature elevation to 104° F., elevated erythrocyte sedimentation rate, and complete A-V dissociation on the electrocardiogram. Cortisone was started 22 June 1953. Within two days the patient became asymptomatic and the laboratory findings returned to normal limits. Cortisone was discontinued 20 July 1953. Six days prior to this, the electrocardiogram revealed a prolonged P-R interval of 0.28 second; rate, 80. This finding persisted until 3 August. On 17 July the patient developed an apical diastolic murmur which subsequently has become prominent and unchanging. On 21 July he began to have temperature elevation reaching 102.8° F. He developed polyarthritis on 24 July. On 26 July the patient was started on the following small descending doses of sodium salicylate: 2.6 grams for two days, 2 grams for two days, 1.3 grams for one day, 1 gram for one day, 0.6 gram for one day, and 0.3 gram for one day in an attempt to control the marked withdrawal phenomenon. The joint symptoms subsided and the ele-

vated temperature returned to normal. On 29 July, the sedimentation rate was 35 mm. at the end of the first hour. This persisted for 10 days. (Severity of illness, marked; withdrawal effects, three plus.)

Case 5. A 19-year-old Negro was admitted to this hospital 2 July 1953 complaining of swelling, tenderness, pain, and limited motion in the right ankle and right knee of four days' duration. The temperature on admission was 101.2° F., and an elevated erythrocyte sedimentation rate was present. Cortisone therapy was begun 7 July with symptomatic improvement and a return of the sedimentation rate to normal. It was discontinued 3 August. On 6 August the patient showed temperature elevation to 100.4° F., but with the exception of vague malaise and anorexia, no other withdrawal symptoms were seen. (Severity of illness, mild; withdrawal effects, one plus.)

Case 6. This 17-year-old youth was admitted to this hospital 2 June 1953 complaining of pain and tenderness of two weeks' duration in the right knee, the left hip, and the proximal interphalangeal joint of the middle finger of the right hand. There was no objective evidence of joint involvement, and the heart and laboratory findings were normal. During the next four weeks the patient had intermittent temperature elevation to 100.8° F. On two occasions there was objective evidence of polyarthritis. An elevated erythrocyte sedimentation rate was obtained, and the patient was placed on the cortisone regimen on 3 July 1953. He became asymptomatic and at the time of its discontinuance on 30 July he showed no withdrawal effects. (Severity of illness, mild; withdrawal effects, none.)

Case 7. This 19-year-old youth was admitted to this hospital 1 July 1953 with a history of pain, swelling, redness, and tenderness of the right ankle of one-day duration. Physical examination on admission revealed a temperature of 101.2° F., pulse rate of 120, a basal systolic gallop, and a grade 1 apical systolic murmur. Erythrocyte sedimentation rates were 52 and 35 mm. at the end of the first hour, and an electrocardiogram showed a P-R interval of 0.20 second at a rate of 120. Cortisone was started 2 July 1953 and symptomatic and laboratory evidence of activity disappeared. Transient apical and basal diastolic murmurs were heard during the course of therapy. Medication was discontinued on 30 July. On 31 July and for the next seventeen days the patient showed a tachycardia varying from 110 to 128. On 2, 4, and 8 August the patient showed a temperature elevation to 100.4° F. (Severity of illness, mild; withdrawal effects, two plus.)

Case 8. A 21-year-old man was admitted to this hospital with swelling, redness, tenderness, and pain in the right ankle of two-day duration. On admission, his temperature was 104° F., a grade 2 apical systolic murmur and a grade 2 basal diastolic murmur were present, and erythrocyte sedimentation rates were 17, 44, and 23 mm. at the end of the first hour. Cortisone treatment was started 26 June 1953, and the polyarthritis disappeared and the temperature and sedimentation rate returned to normal. Murmurs subsided over a three-week period. On 20 July, he developed temperature elevation, marked malaise, and anorexia. Therapy was discontinued 23 July. Temperature remained above normal for nine days, reaching a high of 104° F. Sedimentation rate became elevated on 23 July and remained so for 13 days, reaching a high of 49 mm. at the end of the first hour. (Severity of illness, moderate; withdrawal effects, two plus.)

Case 9. This 20-year-old man was readmitted to this hospital 29 July 1953. He had been hospitalized with acute rheumatic fever from November 1952 to April 1953, during which time he had received combined salicylate and cortisone therapy. In June 1953 he developed "painful swollen feet," pain in both knees, and marked malaise. Physical examination on readmission revealed a temperature of 100.8° F., polyarthritis, a grade 3 apical systolic murmur, a grade 2 apical diastolic murmur, and a soft basal diastolic murmur. The erythrocyte sedimentation rate was 37 mm. at the end of the first hour. He had been given cortisone from 2 July to 29 July 1953, and the polyarthritis disappeared, and the temperature and laboratory findings returned to normal. Subjective vague myalgias, however, persisted throughout the course of therapy. On 20 July he developed temperature elevation to 102.2° F. This persisted for 11 days. On 24 July he again developed pain in the left shoulder and low back. This persisted for three days. On 29 July the erythrocyte sedimentation rate was increased and it remained so for 10 days. (Severity of illness, marked; withdrawal effects, three plus.)

Case 10. This 19-year-old man was admitted to this hospital 25 June 1953 complaining of pain and tenderness in both ankles, malaise, and anorexia of four-day duration. Physical examination revealed low-grade temperature elevation, a grade 2 apical systolic murmur, and a swollen, red, tender left ankle. Erythrocyte sedimentation rates during the first week of hospitalization were 41, 47, and 42 mm. at the end of the first hour. Cortisone was begun on 24 June and the patient showed rapid symptomatic relief. The sedimentation rate returned to normal. Therapy was stopped 26 July. On 27 and 29 July the patient had a mildly elevated erythrocyte sedimentation rate of 22 and 21 mm. at the end of the first hour, respectively. There was some vague ma-

laise and anorexia for one week, but the patient showed no other withdrawal effects. (Severity of illness, mild; withdrawal effects, one plus.)

Case 11. A 19-year-old youth was admitted to this hospital 4 August 1953 complaining of pain and tenderness of one-week duration in the right hip, both shoulders, and both plantar arches. Physical examination on admission revealed a temperature of 101.8° F., polyarthritis, and a grade 1 apical systolic murmur. Erythrocyte sedimentation rate was 35 mm. at the end of the first hour. An electrocardiogram revealed a "shifting pacemaker" from the sinoauricular to the auriculoventricular node. Cortisone therapy was begun 5 August, and the patient improved symptomatically and the laboratory tests returned to within normal limits. Cortisone was discontinued 1 September. On 29 August, the patient developed a swollen, red, tender, painful right wrist. This lasted four days. The patient had no other symptoms and laboratory determinations remained within normal limits. (Severity of illness, moderate; withdrawal effects, three plus.)

Case 12. This 20-year-old man was admitted 27 July with a history of a swollen, tender, painful left knee and an intermittent "skin rash" of one-week duration. Physical examination revealed a temperature of 100.6° F., polyarthritis, a grade 2 apical systolic murmur, a questionable basilar diastolic murmur, and erythema marginatum. The sedimentation rate was 49 mm. at the end of the first hour. An electrocardiogram revealed a P-R interval of .20 at a rate of 94. Cortisone was begun 30 July and all positive findings except intermittent erythema marginatum subsided. Cortisone was discontinued 26 August. Beginning 27 August an apical mid-diastolic murmur was heard. From 2 to 8 September, the patient ran a low-grade temperature elevation to 100.4° F. Intermittent erythema marginatum has persisted. (Severity of illness, moderate; withdrawal effects, three plus.)

OBSERVATIONS

Withdrawal effects occurred in 10 of 12 cases from nine days before to seven days after therapy was discontinued. There was no characteristic pattern of its onset or of its course. The most frequent manifestation was fever, occurring in eight of the patients showing withdrawal effects. Next in frequency were elevated erythrocyte sedimentation rate in four, polyarthritis in four, abnormal electrocardiographic findings in two, development of diastolic murmurs in two, and tachycardia in one. These abnormal findings usually subsided in from one to 19 days, although in three cases elevated sedimentation rate (case 2) and an apical diastolic murmur (cases 4 and 12) persisted.

Withdrawal effects may be classified as follows: Five patients in the three plus group, two in the two plus group, three in the one plus group, and two in the group without withdrawal effects. Generally speaking, although the number of cases was altogether too small, it would seem that the withdrawal effects were more pronounced in the cases with severe carditis at the onset of their illness (table 1). Withdrawal effects were also greater in those individuals who had had previous attacks of rheumatic fever (cases 2 and 9).

DISCUSSION

It is recognized that some of these findings may represent a release or escape from cortisone suppression rather than true withdrawal effects. However, this makes them no less important and does not change their possible significance.

It is in the patient with severe rheumatic carditis or previous history of rheumatic fever that a severe withdrawal is of the most consequence because it subjects the individual who has the least tolerance to the most strain. It is the belief of the authors that altogether too little attention has been paid to this phenomenon and that in the evaluation of therapy one must consider the possible consequences of the withdrawal period. It is also believed that methods of lessening the severity of symptoms or shortening the withdrawal period are important future considerations.

Seven additional patients have been treated with large doses of salicylates: 9.3 grams for three days, 8.3 grams for three days, 6 grams for 15 days, 5 grams for two days, 3.3 grams for two days, 1.6 grams for two days, and 0.6 gram for one day. Total: 28 days, 163.2 grams. The withdrawal effects in these patients were essentially no different from those in the patients receiving cortisone. Four patients may be placed in the three plus group, one in the one plus group, and two were without withdrawal effects.

SUMMARY

In twelve patients with acute rheumatic fever, who were treated with cortisone, varying degrees of withdrawal effects were observed. Patients with severe rheumatic carditis and those with previous rheumatic fever presented the most pronounced signs of withdrawal.

REFERENCES

1. Committee of the American Rheumatism Association: Primer on rheumatic diseases. *J. A. M. A.* 152: 323-331, May 23, 1953.

2. Massell, B. F., and Warren, J. E.: Effect of pituitary adrenocorticotropic hormone (ACTH) on rheumatic fever and rheumatic carditis. *J. A. M. A.* 144: 1335-1341, Dec. 16, 1950.

3. Wilson, M. G., and Helper, H. N.: Effect of pituitary adrenocorticotropic hormone (ACTH) in acute rheumatic carditis. *J. A. M. A.* 145: 133-138, Jan. 20, 1951.

4. Massell, B. F.; Warren, J. E.; Sturgis, G. P.; Hall, B.; and Craige, E.: Clinical response of rheumatic fever and acute carditis to ACTH. *New England J. Med.* 242: 641-647, Apr. 27, 1950; 692-698, May 4, 1950.

5. Ziegra, S. R., and Kuttner, A. G.: Reappearance of abnormal laboratory findings in rheumatic patients following withdrawal of ACTH or cortisone (with special reference to C-reactive protein). *Am. J. M. Sc.* 222: 516-522, Nov. 1951.

6. Taran, L. M., and Gulotta, G. A.: Withdrawal effects following cortisone and ACTH therapy in rheumatic carditis in children. *Bull. St. Francis Sanatorium* 9: 1-8, Oct. 1952.

7. Jones, T. D.: Diagnosis of rheumatic fever. *J. A. M. A.* 126: 481-484, Oct. 21, 1944.

Captain Charles F. Gell Given John Jeffries Award for 1953

Captain Charles F. Gell, MC, USN, Director of the Naval Aviation Medical Acceleration Laboratory, Johnsville, Pa., received the 1953 John Jeffries Award on 25 January at the "Honors Night" dinner of the Institute of the Aeronautical Sciences at the Astor Hotel in New York during its twenty-second annual meeting. The award, which consists of an appropriate plaque and an honorarium, is given each year "for outstanding contributions to the advancements of aeronautics through medical research."

A native of Chicago, Captain Gell graduated from Loyola University School of Medicine in 1936 and was commissioned a lieutenant (jg) in the Medical Corps, U. S. Navy, in 1938. He was graduated from the School of Aviation Medicine, Randolph Air Force Base, Texas, in 1938 with the rating of flight surgeon, and was designated a naval aviator in 1945 following the completion of a course in flight training at the Naval Air Station, Pensacola, Fla. He has been engaged for several years in research on the effects of acceleration on aircraft pilots, and has published many articles in this special field of aviation medicine.

The John Jeffries Award was established in 1940 by the Institute of the Aeronautical Sciences in honor of the memory of Dr. John Jeffries, an American physician who, with Pierre Blanchard, the French balloonist, made the first aerial crossing of the English Channel in 1785, and on a previous voyage made the earliest recorded scientific observations from the air. The 13 previous recipients of this award include seven regular Medical Corps officers of the Navy and Air Force.

285934 O—54——3

HYPERTHYROIDISM TREATED WITH IODINE-131

ELMER R. KING, *Commander, MC, USN*
LUTHER W. BRADY, Jr., *Lieutenant, MC, USN*
HAROLD A. SPARKS, Jr., *Lieutenant, MC, USN*
MALCOLM W. MASON, *Commander, MC, USN*
BARTHOLOMEW W. HOGAN, *Rear Admiral, MC, USN*

IT is generally acknowledged that the over-all results of radioisotope therapy have been disappointing, but the results obtained by the use of iodine-131 in treating hyperthyroidism appear to have compensated for the time and expense invested in less successful therapeutic attempts with radioisotopes. This use of radioiodine was first reported by Hamilton and Lawrence[1] and Hertz and Roberts[2] in 1942. In the past decade thousands of patients suffering from hyperthyroidism have been successfully treated with iodine-131. Recently McCullagh[3] reported over 600 such cases with results which he terms, "consistently excellent."

The purpose of this article is not to report a new method or different results, but to add 40 consecutive, unselected patients with hyperthyroidism and cardiac disease to the total group treated with radioiodine during the first decade of its use.

PATIENT SELECTION

All patients presented have had follow-ups ranging from six months to three years. It was coincidental that 20 men and 20 women constituted the series.

Surgery was recommended for all patients in the child-producing age, but a few young patients were so toxic they could not be prepared for surgery and were treated with radioiodine. The younger age group was treated by surgery, not because our group believed that the dose of iodine-131 required to treat them would endanger their reproductive capacities, nor because of any accepted danger of hereditary complications, but because we wished to avoid controversies with our colleagues.

From U. S. Naval Hospital, Bethesda, Md. Commander King now on board the U. S. S. *Valley Forge*.

Patients with toxic adenomas were not treated with radioiodine, but were referred for surgical treatment. Experience has shown that it is very difficult to treat such patients adequately with iodine-131, and if so treated, the condition recurs in a large number. Once a toxic adenoma is "burned out" with radioiodine, another one may form from a latent nest of cells to replace the treated nodule. Toxic nodular goiters were not selected because of the high incidence of carcinoma in the adenomas.

In general, patients selected for iodine-131 therapy were over 35 years of age and displayed clinical hyperthyroidism, with or without exophthalmos, substantiated by BMR tests and iodine-131 uptake studies. Many of the patients had been operated on previously. A few were senile cardiac patients who did not present marked hyperthyroidism. There were also a number with auricular fibrillation in a mild to severe hyperthyroid state.

METHODOLOGY AND DOSAGE

Prior to treatment all patients were studied by means of iodine-131 thyroid uptake studies. A dose of 50 microcuries was administered orally, and counts were made with a calibrated collimated Geiger tube 12 inches from the isthmus of the thyroid gland after 24 and 48 hours. No urinary excretion studies were performed. The patient was removed from all iodine-containing drugs or compounds, including the radiopaque materials and all antithyroid compounds, for at least three weeks prior to the tracer study.

In order to predetermine the dose of radiation delivered to the thyroid tissue, it is necessary to estimate the weight of the thyroid gland. Even then an accurate determination is not possible because the isotope has been shown by autoradiographs to have an uneven distribution throughout the tissue. Consequently, some areas will receive a much higher radiation dose than others. In the majority of patients we have found it impossible to estimate the dose of iodine-131 on the basis of the weight of the thyroid gland. Because of this we have adopted an empirical dose of about 5 millicuries of iodine-131 with which we treat the majority of our patients. This was done with the understanding that a number of these patients would require an additional dose after a period of evaluation ranging from three to six months.

The accepted tissue dose to the thyroid gland required for a regression of the symptoms of hyperthyroidism is of the order of 15,000 to 30,000 roentgen equivalent physical. This tissue dose can be achieved by a retained dose of 100 to 200 microcuries of iodine-131 uniformly distributed through each gram of thyroid tissue present.

The therapeutic dose of iodine-131 was administered orally. Until recently, hospitalization for from three to seven days was required of all patients treated. No hospitalization is required at the present time.[4] During the first 96 hours after treatment all urine was collected and daily radio-assays were performed in order to estimate the iodine-131 retention. No special diets, orders, or precautions were necessary following treatment in this group of patients.

CASE REPORTS

Case 9. This 42-year-old white woman developed hyperthyroidism early in 1950 and in October, after preparation with propylthiouracil and Lugol's solution, a subtotal thyroidectomy was performed. Following this she continued to have symptoms of Graves' disease, and was given Lugol's solution, roentgen-ray therapy, and propylthiouracil at various times without control of symptoms. A toxic manifestation to propylthiouracil eventually developed, and the patient was referred to this hospital for the first time on 23 January 1952. Physical examination on entry revealed tachycardia, exophthalmos, and a diffusely enlarged thyroid gland. An iodine-131 tracer study on 28 January showed 63 percent concentration in the gland at 48 hours. On 4 February the initial therapeutic dose of 5.2 millicuries of iodine-131 was administered.

In June the patient returned for evaluation and stated that about six weeks after treatment she had noted a definite decrease in nervousness and tremor. A second tracer study on 5 June showed 49 percent concentration at 48 hours. A second therapeutic dose of 5.0 millicuries of iodine-131 was given on 13 June. On 13 October a third tracer study revealed 26 percent concentration at 48 hours. The patient was asymptomatic and has remained so to date.

Case 10. This 36-year-old woman was admitted to this hospital on 16 January 1951 complaining of extreme nervousness, intolerance to heat, large appetite, and easy fatigability of seven months' duration. In 1944 the diagnosis of Graves' disease had been first established and a subtotal thyroidectomy had been performed with complete amelioration of all symptoms until seven months prior to entry. Physical examination revealed an extremely thin, apprehensive, white woman with tachycardia, fine tremors of the hands, mild exophthalmos, and a diffusely enlarged thyroid gland. On 7 February 1951 an iodine-131 tracer study showed 70 percent concentration in the thyroid gland at 48 hours. The initial therapeutic dose of 5.6 millicuries of iodine-131 was given on 19 February.

She was discharged to home, but returned to the hospital for evaluation on 21 May. At that time she stated that she felt per-

fectly well. There was absence of tremor, tachycardia, and exophthalmos, and the thyroid gland had returned to normal size. A second tracer study showed 30 percent concentration at 48 hours.

A study on 13 December showed 25 percent concentration at 48 hours. At that time the patient felt perfectly well and has remained asymptomatic to date.

Case 12. This 48-year-old woman was first seen at this hospital on 19 November 1951. She had hyperthyroidism of nine years' duration. Five years previously a subtotal thyroidectomy had given only partial relief from symptoms of Graves' disease. On admission she complained of weakness, nervousness, tremors, vomiting, and bouts of diarrhea. Physical examination revealed a hyperactive, anxious woman with a markedly enlarged thyroid gland. There was a bruit over the gland on auscultation. An iodine-131 tracer study showed 73 percent concentration at 48 hours. On 12 March 1952 the initial therapeutic dose of 8.0 millicuries of iodine-131 was given.

She returned for re-evaluation on 9 June and stated that during the previous 30 days she had felt perfectly well and had gained 20 pounds. All emotional instability and tremor had disappeared. A repeat iodine-131 tracer study on 14 June showed 29 percent concentration at 48 hours. The patient felt perfectly well.

Case 19. This 51-year-old man was first seen at this hospital on 15 October 1951 complaining of dyspnea on exertion, orthopnea, ankle edema of one month's duration, intolerance to heat, excessive appetite without weight gain, nervousness, and palpitation of the heart of four years' duration. Physical examination on admission revealed a chronically ill white male with auricular fibrillation, pulmonary edema, hepatomegaly, and ankle edema. There was no evidence of hypertension or valvular heart disease. On entry he was given digitalis, diuretics, a low sodium diet, and rest in bed. There was prompt diuresis with a weight loss of 20 pounds. All evidence of fluid retention cleared but the auricular fibrillation persisted.

On 5 November an iodine-131 tracer study was performed with 53 percent concentration in the thyroid gland in 48 hours. The initial therapeutic dose of 8.0 millicuries of iodine-131 was given on 9 November. On 13 November the auricular fibrillation was converted to sinus rhythm with quinidine sulfate.

During the following five months the patient remained entirely asymptomatic while on full activity. In that time he gained solid weight from an initial 171 pounds to 191 pounds. There was no recurrence of cardiac arrhythmia.

On 10 April 1952 an iodine-131 tracer study showed 19 percent concentration in the thyroid gland. The patient has remained asymptomatic.

Case 29. This 25-year-old woman was referred to this hospital on 5 February 1952 with hyperthyroidism of 18 months' duration. Treatment with propylthiouracil prior to admission was discontinued, due to a sensitivity dermatitis and agranulocytosis. Physical examination on entry revealed a thin, apprehensive white female with a diffusely enlarged thyroid gland, tremor of the hands, and tachycardia to 145 per minute. Serial BMR studies averaged plus 35 percent. All attempts to control the condition were unsuccessful and subtotal thyroidectomy was deemed inadvisable. The patient's symptoms progressed rapidly and dictated the therapeutic use of iodine-131 as an emergency measure.

On 3 March the initial therapeutic dose, 7.0 millicuries of iodine-131, was administered. Within one month there was prompt regression of symptoms with return of heart rate to normal. A follow-up iodine-131 tracer study on 10 July showed 65 percent concentration in the thyroid gland in 48 hours. A second therapeutic dose of 5.0 millicuries of iodine-131 was then given on 15 July. The patient was seen again on 22 October at which time an iodine-131 tracer study was 24 percent concentration at 48 hours. There were absolutely no symptoms of Graves' disease and the patient had gained 15 pounds in weight.

Case 30. This 51-year-old man was first seen at this hospital on 27 November 1950. On entry he complained of easy fatigability, intolerance to heat, increased nervousness of one year's duration, and a fine tremor of the hands of eight years' duration. During the year prior to admission he had lost 20 pounds in spite of an excessive appetite. In June auricular fibrillation began and persisted on admission. Physical examination revealed a totally irregular radial pulse of 112 per minute and a coarse tremor of the hands which made legible writing impossible. There was no evidence of hypertension or valvular heart disease.

On 4 December an iodine-131 tracer study showed 58 percent concentration in the thyroid gland at 48 hours. On 18 December 1950 the patient was given the initial therapeutic dose of iodine-131 of 10 millicuries. Approximately three weeks later he stated that he was losing the intolerance to heat and was becoming less nervous. With quinidine sulfate the auricular fibrillation was converted to sinus rhythm on 19 January. During the next three months the patient gained 16 pounds. All symptoms of Graves' disease cleared and he maintained a normal cardiac rhythm.

In November 1952, he returned for evaluation. During the intervening 20 months he had remained on full duty without any difficulty. An iodine-131 tracer study on 10 November revealed 18 percent concentration at 48 hours.

RESULTS

An equal number of men and women were treated (tables 1 and 2), but this was coincidental.

TABLE 1

Patient	Sex	Age	Pretherapy tracer (percent)	Number of therapeutic doses necessary	Total dose (mc.)	Most recent post-therapy tracer (percent)
1	F	36	46	1	5	
2	M	34	79	2	10.7	4
3	M	42	57	2	12.6	18
4	F	68	76	2	10.4	20
5	M	58	40	1	10.0	20
6	M	35	50	1	10.1	18
7	M	68	37	3	29.0	
8	M	46	57	1	5.0	50
9	F	42	63	2	10.2	26
10	F	37	70	1	5.6	25
11	F	64	63	2	10.0	38
12	F	47	73	1	8.0	29
13	M	42	40	2	10.0	55
14	F	60	56	4	23.3	33
15	F	64	43	1	5.0	11
16	M	30	50	1	5.0	12
17	F	44	62	2	15.5	
18	F	42	75	1	5.5	5
19	M	51	53	1	8.0	19
20	F	53	60	1	10.2	12
21	M	55	57	1	5	10
22	F	53	74	1	10	46
23	F	38	70	1	6	0
24	F	44	53	1	7.3	5
25	M	53	75	2	9.9	29
26	F	57	65	1	10.0	24
27	F	31	62	1	5.0	9
28	F	62	65	2	15.1	2.5
29	F	25		2	12.0	24
30	M	51	58	1	10.0	18
31	M	40	75	1	15.1	30
32	M	56	90	3	35.5	6
33	M	63	54	1	5.4	13
34	F	55	70	1	6.0	13
35	F	69	60	1	10.0	4
36	M	55	71	3	15.0	24
37	M	47	43	1	5.0	10
38	M	51	47	1	5.4	12
39	M	45	58	1	5.1	15
40	M	52	55	1	10.7	0

TABLE 2

	Men	Women	Over-all results
Number of patients	20	20	40
Mean age, years	48	49	48.5
Mean dose	11.1 mc.	9.5 mc.	10.5 mc.
Requiring multiple doses	35 percent	35 percent	35 percent
Recurrences following surgery	5 percent	35 percent	20 percent
Concomitant heart disease	30 percent	15 percent	22 percent
Percentage of those treated:			
Clinically hypothyroid	25 percent	15 percent	20 percent
Clinically in remission	65 percent	85 percent	75 percent
Clinically hyperthyroid	10 percent	0	5 percent

Although no selection of patients was made, the mean age and the mean total dose were nearly the same in both men and women (table 2). Thirty-five percent of each sex required multiple doses of radioiodine in order to produce a clinical remission. The ratio of women to men who were suffering from recurrences following surgical intervention was seven to one. Twenty-two percent of the treated patients exhibited heart disease in addition to presenting a hyperthyroid state. Three fourths of the patients treated were clinically cured. Twenty percent of those treated subsequently required thyroid to maintain a normal metabolic state. Three of these patients (seven percent) were frankly myxedematous. Two of the patients (five percent) were not available for follow-up studies. In absolute figures these must be added to the myxedematous group, making a maximum of 12 percent of all treated patients who might possibly suffer from myxedema following this form of therapy. It must be stated also that two patients presented evidence of a continued hyperthyroid state following iodine-131 therapy and are to return for further study.

TABLE 3

	Men (percent)	Women (percent)	Over-all (percent)
Patients showing exophthalmos	28	14	42
Percentage of above patients with remission of exophthalmos	29	23	52
Progression of exophthalmos	12	0	12
No change in exophthalmos	23	12	36

Table 3 shows the number of patients in this series suffering from exophthalmos. Twice as many men as women presented additional complaints of exophthalmos. A total of 52 percent of those with exophthalmos underwent a remission following therapy with iodine-131. It is acknowledged that this condition is not completely understood and that those patients who experienced relief probably exhibited a "levator spasm" of the eyelids rather than true exophthalmos. Twelve percent of the male patients and no female patients demonstrated a progression of their exophthalmos. In one of these patients the condition progressed to a malignant state and required a surgical procedure. In addition, it should be stated that of the 17 patients who presented exophthalmos, 36 percent remained stationary in regard to their eye symptoms. Of this latter group, the ratio of men to women was nearly two to one.

DISCUSSION

One of the most important problems regarding the treatment of hyperthyroid patients has in most instances been overlooked. It is usually recognized that differentiation between patients in a pure anxiety state and those in a hyperthyroid state is often difficult, and in fact these conditions themselves tend to overlap. However, once one or the other diagnosis is "established," the other phase is very often forgotten.

The results of radioiodine treatment of the hyperthyroid state are equal to or better than the results of an operation. In addition the patient may be assured there will be no damage to his recurrent laryngeal nerves or parathyroids if he is treated with radioiodine. Many patients, particularly those with "psychic overlays," are aware of these complications that may follow surgery.

In the selection of patients in this series no attempt was made to treat any patient under 40 years of age, although, as may be noted in table 1, four women and two men younger than this age were accepted. Other than this fact, the cases presented were unselected and are the first 40 patients treated by this clinical radioisotope laboratory.

The fact that the sexes are equally divided, that the average age of each sex is the same, and that the average total dose of radioiodine administered each sex is the same appears significant. It is for these reasons that the results are presented as a comparison of male and female patients. A total of eight patients treated with radioiodine for hyperthyroidism had previously been treated by one or more surgical procedures for the same disease. Seven of these patients were women and one was a man. However, multiple doses of radioiodine were necessary in seven

men and seven women (35 percent of the series) before a remission of the symptoms could be obtained. Of the patients requiring multiple doses of iodine-131, only two had previously undergone surgical intervention. This bears out the fact that the return of symptoms after the operation was not due to a toxic nodular goiter which had not been recognized. It has been stated that recurrences are numerous in the latter disease following the use of radioiodine therapy as well as following surgical procedures.

Table 2 also reveals that 75 percent of the patients treated had a good clinical remission. This compares well with the results of other investigators. This figure of 75 percent might be increased because two of the patients who had received one therapeutic dose remain, at the time of writing, in an improved state although presenting clinical hyperthyroidism which will require an additional dose of iodine-131. Twenty percent of the patients require thyroid to maintain a comfortable metabolic level. Of this group, three patients are frankly myxedematous, two of them purposely rendered so because of concomitant heart disease. To the myxedematous group, which we have interpreted as presenting unfavorable results, are added two patients who could not be followed. Thus the maximum number of unfavorable responses possible are five or 12 percent of the total. This compares favorably with the 10 percent reported by other investigators as developing myxedema following this form of therapy.

Six men and three women suffered from heart diseases in addition to their hyperthyroidism. Seven of these patients presented auricular fibrillation, and all such patients responded to the described treatment for their thyroid condition. In all patients in the latter group, the hyperthyroid state was discovered as a part of the routine clinical work-up. One patient with intractable angina also was discovered to have had an increased thyroid function.

From the results of this study it is suggested that judicious use of radioiodine in treatment of diffuse hyperthyroidism is a practical and safe procedure. The presence of a hyperthyroid state is also to be considered in all cases of auricular fibrillation and in other chronic heart diseases.

SUMMARY

Forty consecutive unselected patients with hyperthyroidism were treated with iodine-131. Follow-ups varied from six months to three years. There were an equal number of men and women in the series, and both the mean age and the total mean dose required for each sex approached equality. The number of patients

of each sex requiring more than one therapeutic dose for maximum clinical remission also was equal.

Seven women and one man were treated following one or more previous surgical procedures. Nine of the patients treated suffered from concomitant heart disease. Three fourths of the patients treated had a good clinical remission. Eight percent became myxedematous and in twelve percent a mild hypothyroid state resulted. Five percent were not followed. Seventeen of the patients presented additional complaints of exophthalmos. Of this number 52 percent had remission of their eye symptoms, six percent noted progression of their exophthalmos, and in 36 percent the eye symptoms remained stationary.

REFERENCES

1. Hamilton, J. G., and Lawrence, J. H.: Recent clinical developments in therapeutic application of radio-phosphorus and radio-iodine. (Proceedings of the thirty-fourth annual meeting of the American Society for Clinical Investigation, Atlantic City, N. J., May 4, 1942) *J. Clin. Investigation* 21: 624, Sept. 1942.

2. Hertz, S., and Roberts, A.: Application of radioactive iodine in therapy of Graves' disease. (Proceedings of the thirty-fourth annual meeting of the American Society for Clinical Investigation, Atlantic City, N. J., May 4, 1942) *J. Clin. Investigation* 21: 624, Sept. 1942.

3. McCullagh, E. P.: Radioactive iodine in treatment of hyperthyroidism. *Ann. Int. Med.* 37: 739-744, Oct. 1952.

4. Criteria for medical use of radioisotopes. *Isotopics* 7: 3, 1952.

Duodenal Ulcer Surgery

To make a diagnosis of duodenal ulcer is one thing, and to know when to operate is quite another. A simple ulcer with which the patient can live in comfort with reasonable care requires no surgery. A complicated ulcer which continues to incapacitate the patient over a period of years, however, is not a simple ulcer. To persist in delaying operation in such cases is as unsound in principle as to operate without adequate justification. Herein lies a fruitful field for the combined efforts of the physician and the surgeon. The ultimate result depends largely upon the choice of the operation. At present, there is a trend toward resection for acute perforations, provided the patient's condition permits. In the majority of cases, however, the immediate necessity of saving the patient's life calls for nothing more than closure of the perforation. The ultimate result is a secondary consideration, even though a large number of those who have a closure alone may be expected to require a subsequent operation.

—R. L. SANDERS, M. D.
in *Journal of the Kansas Medical Society*
p. 505, Nov. 1953

THE NAVAL PSYCHOLOGIST IN THE FAR EAST COMMAND

GEORGE A. W. STOUFFER, Jr., *Lieutenant Commander, MSC, USNR*
ALLEN E. McMICHAEL, *Lieutenant, junior grade, MSC, USNR*

TO understand the role of the clinical psychologist in the Far East Command one must understand the physical and psychologic situation in which he operates. No matter where the psychologist is assigned in this command he becomes a member of a medical team. It is probably best to describe the "big picture" first and locate the psychologist in his usual setting.

A U. S. Marine Corps psychiatric casualty was first seen by either a psychiatrist or a psychologist after he had been evacuated to the medical battalion by his regimental medical officer. If he responded to rest, sedation, and reassurance he was returned to duty with his unit. At the forward medical company the marine psychiatric casualty saw the psychiatrist or psychologist, sometimes both, for initial evaluation away from the scene of combat. The forward psychiatric unit established there attempted rapidly to evaluate all of the incoming psychiatric casualties, keeping only those patients who might respond quickly to sedation, warm food, a dry place to sleep, and a diminution of combat noise. Those who did not appear to be promising candidates for the responsibility of active combat were either sent to the rear psychiatric unit or evacuated to the hospital ships for further evaluation and disposition. The forward psychiatric unit attempted to receive the psychiatric casualty as far forward as possible, as this minimized the secondary gain of the patient's symptoms. The rear psychiatric unit might be two miles to the rear or beyond the division command post. In the beginning, the forward psychiatric unit consisted of the psychiatrist, and the rear psychiatric unit was staffed by the psychologist; later, when more professional assistance arrived, the more experienced team made up the forward unit while the rear unit was composed of the less experienced. At times the situation demanded that all of the psychiatrists and psychologists work within the same unit. It was

From First Marine Division and U. S. Naval Hospital, Yokosuka, Japan. Lt. McMichael is now at U. S. Naval Academy, Annapolis, Md.

at these times that the various medical companies needed to be reassured that the unit would not create a state mental hospital atmosphere.

EVALUATION OF CASUALTIES

On board a U. S. naval hospital ship the psychiatric casualty was evaluated by a psychiatrist, but there was no psychologist available. If the casualty was not returned to the division he was evacuated to the U. S. Naval Hospital, Yokosuka, Japan. Here again the patient was evaluated by the neuropsychiatric staff, which included a psychologist, and returned to duty, sent to a rehabilitation camp, or evacuated to the United States. The subtle differentiation between evaluation and treatment has not been discussed above because of the difficulty of making what might be an artificial distinction. Any casualty who moved beyond the division area was logged as an evacuee. It is interesting to note in this regard that for the 10-month interval that this psychiatric unit was assigned to the First Marine Division, 56 percent of the patients seen were returned to an effective duty status while the remaining 44 percent were evacuated to the hospital ships and beyond. Such a percentage is not impressive until one considers that less than 10 percent were readmitted. Also, less than 10 percent were evacuated to the continental limits of the United States. That such an evaluation program was carried out with dispatch can be verified when one discovers that 96 percent of the psychiatric casualties were hospitalized within the First Marine Division for less than 15 days. The efforts of the psychiatric unit represented a sizeable gain for the First Marine Division in terms of manpower. Prior to the arrival of either a psychiatrist or psychologist in Korea, the U. S. Naval Hospital, Yokosuka, had absorbed nearly the entire load of psychiatric casualties.

In April 1951 one of us (A. E. McM.) followed Commander C. S. Mullin, MC, USN, to the First Marine Division while the other was assigned to the neuropsychiatric staff of the U. S. Naval Hospital, Yokosuka. It was at this point that the above-described chain of evacuation was set up. Later, when additional professional assistance was assigned to Korea from this hospital, the psychiatric unit became more than a skeleton of an organization.

HEAVY FLOW OF PATIENTS

In terms of handling the flow of patients, the psychiatric unit differed little in function from early to late 1951. As one might expect, the ratio of psychiatric casualties to those wounded in action varied from 1:10 to 1:4. The latter was the more usual rate. For two professional people to screen the sometimes heavy

flow of patients, as was done earlier in 1951, it seemed advisable for one to remain with the most forward medical company and one to be attached to a more rearward medical company with less crowded facilities. Translated into action, this meant that the psychiatrist functioned both as an evaluator and as an instructor, in that he initially screened the psychiatric casualties at the forward medical company as well as briefed the various battalion and regimental medical officers as to how such casualties could be handled best. The psychologist at this time was with the next rearward medical company where he followed up the psychiatrist's initial impressions. A full history was obtained at this time. Also every effort was made to get the individual participating again as a member of a group through athletics, group games, and individual interview. This was made more difficult by having to either improvise the necessary equipment or to procure it through other sources.

In terms of equipment, the psychologist had a unique problem. He had only the few supplies he had brought with him, and he had no place to store them. It soon became apparent that they would have to be carried by him as a part of his personal gear in moving to various medical companies, especially during the rapid advances and withdrawals of 1951.

SERVICES OF PSYCHOLOGIST REQUIRED

The services of a psychologist were required for psychodiagnostic studies on many occasions. These referrals were initiated for a number of reasons and always through one of the psychiatrists or on a consulting basis with one of the medical company doctors. Of the total number of patients seen by the psychiatric unit, 41 percent were evaluated by psychologists. Of these, about one third were given a complete personality test evaluation. Just as the psychiatrists were at times called on to assist in medical duties unrelated to psychiatry, the psychologists were asked to perform some administrative duties which were unrelated to psychology. By and large, however, the limitations placed on the psychologists were self imposed.

RESEARCH UNDER FIELD CONDITIONS

The field situation for research purposes has many advantages but even more disadvantages. The broad considerations of the research design and the theoretical problems were easily drawn up. The more specific demands of research, such as collecting the data with the various required methodological controls, was difficult at first. The evaluation of the data, the setting up of pilot studies, the statistical considerations, and the control of sampling procedures were denied the psychologist by the nature of the field situation. In fact, without the understanding and sup-

port of the division psychiatrist the possibilities of even collecting the data would have been extremely limited. The priority of research, when there are patients available, is extremely low even for the curious psychologist.

By the time that a psychiatric casualty arrives at the U. S. Naval Hospital, Yokosuka, he has been screened at least four times. Often there is a marked change in the patient from the time he was initially evaluated. Some feel safe for the first time, others feel that they deserved to be sent to the United States immediately, and still others feel extremely resentful that they were not given another chance in combat.

STANDARD TESTS IMPROVISED

With the diagnostic tools available, a problem in initiative was often posed in improvising technics and in the application of standardized procedures to patients. These patients, as in many instances of combat injury, did not lend themselves to the administration of tests in the generally accepted manner. They were frequently bedfast and those with a variety of head injuries were often rendered deaf or mute. The diagnosis and operative procedures, both tentative and established by the medical officers at the time of referral, differed widely in their variety and in covering the interesting features.

To assist in meeting the problem of a heavy work schedule, enlisted hospital corpsmen with interest, education, experience in psychology, and maturity of judgment were selected to assist with the psychologic testing. Their professional activities were confined to the administration of the nonprojective technics and did not include evaluation or interpretation of the results. An effort was made to afford them opportunities for training, and for participation in staff conferences and research at their level of competence or understanding.

CONCLUSIONS

In terms of training, these experiences seem to emphasize the necessity for the psychologist to have a background of experience and contact with medical practices. This is best acquired in a hospital during his training period. In the field there is neither time nor available facilities for "looking up" information one does not possess.

Any long-term procedure of psychiatric treatment of psychological follow-up is not feasible under combat conditions. The emphasis is upon a rapid, accurate evaluation as to the patient's potential for further service and the likelihood of the facilities in the forward area being capable of assisting him to mobilize this potential. The farther from the active combat line the man gets

before treatment is begun, the less probable it is that he can be salvaged for additional effective combat service. The psychologist can expect to work well forward with troops in the field. As a corollary, the more advanced in training and experience the psychologist, the farther forward he can expect to work.

The clinical psychologist, with his present-day training and diagnostic tools, is in a unique position to make a substantial contribution in this team approach to the psychiatric casualty in the field. In the field with combat troops, clinical psychology is offered a new opportunity for research, theories, and broadening the entire scope of clinical practice. Of the psychologist it will require all of the diagnostic, some of the therapeutic, and most of the inventive capacities he possesses.

Joint Committee on Chest X-Ray

In its recent report, the Joint Committee on Chest X-Ray of the American College of Radiology and the American College of Chest Physicians has this to say about double reading of roentgenograms:

"The committee notes the several publications indicating the extent of false negative and false positive reports resulting from inter- and intra-individual variations in interpretations of chest films. From these it is evident that failures to detect tuberculosis can be reduced by multiple readings, but at the expense of increasing the false positives, unless a check mechanism is employed. The simplest elaboration of multiple reading is the independent interpretation of the film by two physicians with referee conference of the two undertaken in those cases in which they disagree. Only those cases on which both agree in conference should be followed.

"While such a procedure may result in the detection of a slightly larger portion of all the abnormal cases, it may not be feasible from an economic or personnel standpoint. Groups responsible for survey operations are urged by the committee to give consideration to double reading as one of the methods by which survey yields may be increased. Availability of financial resources and qualified professional personnel, as well as the need for other services of relative importance, will be determinates in this decision. The committee, therefore, calls attention to some of the virtues of double reading but does not recommend it unreservedly."

—from *Diseases of the Chest*, p. 589, May 1953

DOCTOR-PATIENT RELATIONSHIP IN THE ARMY

FRANCIS W. PRUITT, *Colonel, MC, USA*

THE caliber of medicine has improved tremendously since the day, almost a quarter of a century ago, when my own intern class was assembled and given orientation. Certainly we were a much more bewildered lot than your group today. Improved patient care has been brought about by far-sighted surgeons general and energetic hospital commanders dedicated to the care of the sick soldier. In the wisdom of their planning has been the concept that the hospital and its staff, both professional and administrative, exists for the patient. Over the years we have seen ever increasing progress to improve the patient's care and welfare, and to preserve his integrity as an individual.

An army's success or failure depends on the health of its soldiers. We are responsible for keeping the soldier healthy, physically and mentally. If he is disabled by injury or disease, it is mandatory that he be appropriately treated and returned to military effectiveness as quickly as possible.

The position of the physician in military medicine is somewhat comparable to that of our colleagues in industrial practice. The purpose of both is to give prompt treatment to the patient and to represent the employer's interests. The army physician, however, has a much greater opportunity to be of service to his patients because he is responsible for their care until they are restored to good health. In his hands may rest the life or death of the soldier on the battlefield or in the hospital. Where else could one find such a fertile field to practice the art and science of medicine? Your presence here today is indicative of your interest in military medicine. Some phase of this field of medicine has appealed to you and you wanted to become more familiar with it.

Whether the soldier patient is seen on sick call, on the battlefield, or in our large army hospitals, the medical officer has an

From Walter Reed Army Hospital, Washington, D. C. Presented before new intern class on 30 June 1953.

285934 O—54——4

ample opportunity to practice the art and science of medicine. Let us consider the doctor-patient relationship in each of these situations.

SICK CALL

After entering the Army, the soldier's first introduction to the medical officer is at sick call, usually in a dispensary providing outpatient medical care for the soldier. This facility is not merely a first-aid station but a place intended to provide proper diagnosis, treatment and disposition, as stated in Army Regulations.[1] Most soldiers seeking medical care at sick call do not suffer from serious conditions requiring hospital treatment, but from relatively minor sickness, injury, or concern over personal health and welfare. If they are returned to duty without adequate examination, treatment and reassurance, they continue to worry about their health, lose confidence in the medical officers and become less effective in their assignments.

Good or bad, the soldier will base his impression of the professional care afforded by the Army Medical Service on the treatment afforded him at sick call. It is an opportunity for the alert physician to listen well, be of sympathetic understanding, examine carefully, and prescribe with wisdom. All too often the soldier feels, and many times with justification, that not only has he been treated impersonally and inadequately, but also without understanding and perhaps even callously.

Much could be said about the psychology of sick call.[2,3] When a soldier comes to sick call he has a reason although his symptoms may not be classic for any disease. Nevertheless, to him his appearance there is defensible. Something may have gone wrong with his job or in his company. He may believe the sergeant is "riding" him unnecessarily. The chief clerk may have blamed him for misdirected correspondence and his commanding officer is likely to have listened favorably to the complaints of the sergeant and chief clerk, and then added his own displeasure. Hence, the soldier follows his natural instinct and appears at sick call in a state of dyspeptic bewilderment. It may be his first appearance at this formation and he has no idea of procedure or what may happen to him. It is a common "gripe" among soldiers that the medical officer holding sick call will greet them with a sharp, "What's your complaint?", stick a thermometer in his mouth and, if there is no fever, give him some pills or capsules and dismiss him with, "Here, take this; it may help you."

The word complaint in medicine has a definite and specific meaning, but it may have a different connotation for the layman, especially a soldier. Should we be surprised if he believes that

he is being accused of finding fault? He is coming to the doctor because he feels bad for one reason or another and is not lodging a "complaint" with the inspector general. Isn't it more friendly to call him by name and say, "Won't you sit down, Corporal Jones, and tell me about yourself?" Every soldier has a rating or grade and generally appreciates its being recognized. Respect his privacy and do not question him in the presence of other soldiers or technicians. He will be grateful for this.

EMOTIONS AND ILLNESS

It is well to remember that emotional strifes which may be trivial or unnoticed at home are magnified many fold in the barracks and by the rigors of field duty. Perhaps the soldier may have twisted his ankle playing softball, followed in sequence by disappointment over not being promoted and disapproval of a request for a furlough. Not only is the ankle more distressing than it ordinarily would be, but he may have indigestion as well. These are times when he hopes to find sympathy and understanding in the medical officer as he would in the family physician, and not be told: "There is nothing wrong with you; you are just neurotic." Such a statement is an admission on the part of the medical officer of his inability to cope with the situation.

Remember some of your own emotional reactions at different times such as the polyuria and perhaps headache with nausea immediately preceding a difficult examination in medical school. Recently a national authority in medicine was scheduled to speak twice during a five-day medical meeting. He developed a severe, right-sided headache which persisted until a short time after his second appearance before the assembly; then it suddenly disappeared and did not return during the remainder of the meeting.

It is important, however, to rule out organic pathology before explaining the reasons for functional symptoms. When prescribing treatment at sick call, explain to the soldier why a particular medication is beneficial for his particular case, and under no circumstances turn to the medical technician on duty and say, "Give this guy some APC's."

Sick call is sometimes thought of as a haven for "goldbricks" and a formation which many soldiers use to dodge work. These repeaters at sick call can be detected by the careful physician. Each patient, however, should be given the benefit of the doubt. The understanding and interested physician can appraise these cases without difficulty. Even the professional "goldbrick," on careful questioning, will often lower his guard and reveal much that an indifferent physician would not elicit.

Although soldiers at sick call should be treated promptly and efficiently so that time lost from work may be kept at a minimum, the physician disposing of soldiers in a slipshod fashion is doing the Army, the soldier, and himself an injustice. Show me a commander who objects to the medical officer taking sufficient time to make an adequate and analytical approach to his soldier's problem and I'll show you a mediocre commander. It is often rewarding to telephone the unit commander and inquire about one of his enlisted men who appears to have no organic basis for his symptoms. Remember that the Army is a cross section of our society temporarily set apart for definite and specific duties, and that you may expect to see the best as well as the less desirable specimens of American manhood. Sick call provides a challenge to the physician for he can learn a great deal from the clinical material and puzzling cases he sees.

EFFECT OF COMBAT

An extraordinarily important doctor-patient relationship prevails on the battlefield where man's emotional disturbances may reach their greatest intensity. Here, more than anywhere else, the soldier looks to the medical officer in the role of the family physician for comfort and paternal guidance. Sgt. Jones may have received news from home that his mother has a goiter which necessitates a thyroidectomy. His apprehension is intensified by his absence from home and fear for his personal safety, and he seeks your assistance. When you have done your best to help allay his apprehension, don't drop the matter. When in his company sector at a later date look him up and inquire about his mother; most likely she will have convalesced from her operation and he will tell you about it with genuine appreciation. Incidentally, you may be surprised to learn that after your visit Sgt. Jones lost no time telling others that "the 'Doc' is one swell guy."

It is well known that man becomes more religious during great danger and perhaps on the battlefield one sees a greater religious resurgence than in any other situation. The soldier comes to the medical officer for spiritual guidance in the absence of a chaplain. It is a compliment, indeed, for the soldier to seek from his doctor more than professional care.

Physicians have long recognized the euphoria of the wounded. For such patients a mangled leg means the war is over and they will return home. A great many have only a passing interest in their squad or platoon at this time. The euphoria may be short-lived as the wounded soldier realizes that he is now going to be dependent on others; hence, a varying degree of depression results. Calmness of purpose and a cheerful attitude must be

maintained at all times in the management of these casualties. A word spoken carelessly about the soldier's condition or an apparently casual attitude will cause undue anxiety, and the soldier may lose confidence in you.

In modern times we hear much about shell shock or combat exhaustion in the American soldier. Here again the doctor in uniform can do much in his patient relationship. Immediately after the onset of the Korean conflict a psychiatrist was assigned to each division fighting there. His role in re-establishing self-confidence in the combat soldier has not been given the recognition it deserves. In the division clearing stations it was a common sight to see a large number of these casualties spending two or three days undergoing a rest with sedation and hot food. It was gratifying that 60 percent or more of these men returned to combat effectiveness without being out of the division area. Officers and noncommissioned officers are not immune to this type of fatigue which frequently requires careful management. Self-vilification may be apparent in this group if their unit has met stiff resistance in combat. In addition to blaming themselves for reverses, they may feel persecuted by their superiors. The understanding medical officer can be of great service in rehabilitating this group.

In forward combat areas the medical officer is limited in the amount of definitive therapeutics he can accomplish. He is often obliged to refer a patient to a rear hospital for a procedure he is capable of doing himself. The surgeon who says he could do the operation as well up front, but he has orders not to, is on dangerous ground. As Churchill[4] appropriately stated, such a medical officer is attempting to increase his prestige at the expense of the Medical Corps of which he is a member. "Doctors don't always stand on their professional dignity and integrity under these circumstances," he wrote. "One of the favorite topics at mess tables among lay officers and doctors is the management of neuropsychiatric patients. I've heard the most atrocious advice and criticism handed out to staff officers by uniformed doctors, completely sabotaging the best efforts of the Medical Corps by undermining a trust that should be built up. Doctors would not think of doing this in private practice. They try to uphold the opinions of their colleagues or at least treat them with respect. But in the Army doctors are likely to forget that they are a part of the Medical Corps and that anything they tell the layman about the inadequacy of the Medical Department reduces the confidence of the very people they are there to support. * * * Doctors stand and fall together, and it is only by maintaining the professional dignity and the stature of the Medical Corps and the Medical Department that the mission can be accomplished. A

medical officer should do everything he can to support the teamwork of the Medical Corps and not behave as an individual seeking some special favor or prestige.

"There is a unique dilemma that confronts the doctor in uniform. He represents the humanitarian and ethical standards of society and at the same time he represents the military as a soldier. Once a doctor relinquishes his ethical standards he is treading on dangerous ground, because professional ethics as they pertain to the preservation of human dignity and the rights of a citizen soldier in a free society, must be preserved. * * * There is a part of the doctor's function which, if he will preserve it, is not subject to command for it resides in what we recognize as the ethics of our profession. Under the trying, emotional and brutal atmosphere found in warfare, it is of utmost importance that these ethical standards be preserved."

PATIENTS IN HOSPITALS

The patient relationship in this hospital, will be a vital part of your life in the year just ahead. You are eager to carry out your plans of the practice of medicine according to the ideals you have formulated through your years of education. All of us enter this exciting field with a burning desire to emulate the manner of our favorite professor of yesteryear. Such an ideal could not be more commendable if the professor were one of the masters who practiced the art of medicine as well as the science. We all admire the clinician who treats a sick patient with heart disease and have less esteem for the physician who treats only a diseased heart in a man. Too frequently we see young physicians who know much about mice but little about men. One does not need to spend much time in a ward to know whether the patient-doctor relationship is of a high order or whether it is deplorable. What makes the difference? It is the physician, nurse, and corpsman. All too often hospital wards are operated as dehumanized machines.

The average patient arrives at the receiving office of the hospital, usually after being shaken up in an ambulance. A clerk rapidly questions him about his next of kin and service number. He is seen briefly by the admitting officer, who exhibits only a passing interest in him. Someone takes his clothes and valuables. He is given pajamas which may not fit. He is wheeled to the ward in darkness and finds himself in strange surroundings, in a bed high off the floor, and alone, lonesome and forlorn. It is no wonder that the first person to greet this new patient on the ward, and especially the intern, makes such a profound impression.

One of you may be the first to see him. Make full use of this moment. Approach him with calmness of purpose, sympathetic understanding, alertness, and listen well. He will respond better and have more confidence in you if you will spend 30 seconds getting acquainted. Ask the soldier his name and introduce yourself. Inquire about his organization; you might have mutual acquaintances. Praise his organization in some small way, tell him you have heard it is a fine outfit. Never miss the opportunity to ask him about his home town. You might have relatives or friends there. You may have even visited his home town. If so, his face will light up immediately, he will feel a stronger bond, and you have gone a long way. Never hurry. "Hasty climbers have sudden falls," and many of our diagnostic downfalls are attributable to hurried examinations rather than to lack of knowledge. Do not exhibit impatience or he will believe that you are not interested in his case. Cultivate the faculty of being a good listener. Many a ward officer has been embarrassed when the staff physician on ward rounds listened to the patient's story without interruption and elicited an important clue to the diagnosis which was missed because of a hurriedly taken history. By the time you have completed his history and physical examination, he will consider you his personal physician. The staff man may come and go, but you are his doctor.

NEEDLESS TESTS

A word of caution: there is a tendency to rely on laboratory tests and roentgenograms out of proportion to their value. The average patient has been brought up to believe that a roentgenogram will reveal the cause of his trouble but the physician should request diagnostic procedures with profound thought. It is poor practice of medicine to subject a patient to unnecessary tests. A patient may rightly feel that he is going through all these examinations because his physician does not know the answer to his trouble.

As the eminent physician, Francis Peabody,[5] points out, "Once your relationship with him has been established, you must foster it by every means. Watch his condition closely and he will see that you are alert professionally. Make time to have little talks with him—and these talks need not always be about his symptoms. Remember that you want to know him as a man, and this means you must know about his family and friends, his work and his play. What kind of a person is he—cheerful, depressed, introspective, careless, conscientious, mentally keen or dull?" If you feel that such remarks belong to the days of horse-and-buggy medicine you should be interested in reading Dr. Alvarez's[6] book, "Neuroses," in which he writes: "Patients often resent

our lack of interest in them as human beings. Many a person has said to me: 'That surgeon may have saved my life, but I dislike him and always shall because he had no interest in me aside from my gallbladder; every time during those three weeks when I tried to be friendly he rebuffed me, or he walked coldly away without a word.' In answer, many a surgeon will say, 'How, during my hurried morning rounds, can anyone expect me to stop for a chat?' That is true, but I cannot get over the fact that some of the busiest surgeons I have known did manage often to stop for a moment to ask a kindly question or to say a comforting word. And, with this, some of them did grip their patients to them with bonds of affection and lifelong devotion. Evidently, it can be done." You cannot know your patient too well.

THE PATIENT IS A PERSON

A great many physicians make the mistake of losing the patient's identity and he is referred to as "the patient in bed 10," or "the case of sarcoidosis." You will enhance your prestige by remembering his name when you make rounds. Neither should a patient be referred to as "this boy" or "this guy"—the soldier resents it. He wants to believe he belongs to somebody and will react in a much more friendly manner if referred to by name. You will have a staunch admirer, too, in case you and he are from the same state, if you refer to him as another Hoosier or the like. In the event your diagnosis is not apparent by this stage, you are not wasting time to sit down again with your patient and review his symptoms. You are frequently rewarded. This is an excellent time to inquire about his personal life. It is not unusual to uncover a history of syphilis contracted during some illicit amorous moment that has produced a fixation in the patient. I recently saw such a patient who had infected his wife. He became obsessed with a guilt complex, resulting in his hospitalization for constant headaches. The first physician to see him made a presumptive diagnosis of intracranial tumor and had the patient evacuated across the Pacific as a medical emergency. A more careful physician, in whom the patient had confidence, elicited the story of the patient's dilemma and, after appropriate management, he was returned to effective military duty.

I have dwelt on functional manifestations in our relationship with patients. It takes an astute physician to solve some of these perplexing problems. Let us not be too hasty in telling a patient he or she is neurotic when we are unable to find any organic pathologic condition on early examinations.

Many patients' future outlook has been effected by such injudicious management and equally as many physicians' reputations and prestige have suffered. This unfortunate affair in-

volves women more than men. Too frequently patients with myxedema, thryotoxicosis without exophthalmos, or abdominal symptoms due to internal hernia or gastrointestinal lesions are given an erroneous label of psychoneuroses. Such errors are inexcusable. Not long ago a patient who was a nurse was admitted from another hospital with a diagnosis of psychoneurosis. She had some discomfort in the left flank and the first physician, after an inadequate investigation, labeled her as a frustrated woman. A second physician handled her equally poorly and agreed with the first doctor. The miserable girl was beside herself. A more careful physician, while on evening rounds, sat down for an interview. She calmed herself and gave him a history of distress along the region of the left ureter. The next day she was referred to the urologist who found a narrowing in the ureter which responded well to dilatations. The symptoms disappeared and she returned to duty. It is needless to describe her feelings toward the first two physicians. Fortunately or unfortunately, a staff nurse can have much to do with a physician's professional reputation.

Choose your terminology well when discussing the patient's condition with him. Accustomed as we in medicine are to arteriosclerosis, this term may frighten unnecessarily the introspective patient whose mother's terminal illness was due to this condition. Would it not be kinder to tell him you have found only the changes incident to aging? After all, what therapeutic measures have you to offer him for such a condition? Before the days of antibiotics, the parents of a young girl who died following an appendectomy were highly indignant because the surgeon told them he had "torn away some adhesions at operation." Had he been more gentle, reasoned the parents, their daughter might still be alive.

DRUGS AND DIETS

How else can we improve our relationship with the hospital patient and hasten his convalescence? We are accustomed to prescribing drugs and special diets for our patients, and dismissing the matter. Generally, we can be assured that the nurse is making certain that medications are properly administered to the patient, but what about his meals? You prescribe a specific diet; the dietitian, highly trained in her own right, computes it and makes certain that it is on its way and is as tasty as it can be made. The floor nurse sees that it gets to the bedside, and hurries to lunch. A week later you are surprised to learn that your patient has lost weight. Make it a practice to see the patient's tray at the bedside. You will then know the proper food is reaching him and he will appreciate your interest. Do not dismiss the matter but inspect his tray after it has left the bedside and note the amount and type of food rejected. Call the

dietitian, who will be delighted to come to the ward and discuss the matter with you and the patient's likes and dislikes with him. She is interested, too, because they are also her patients.

Remember that there are other facilities which are established to hasten your patient's return to health. The physical medicine service, with its physical therapists and occupational therapists, is only too happy to be of assistance. When you have an opportunity, visit their departments and see the many aids available for patient rehabilitation. In the event the patient has personal or family problems, secure the assistance of the social work service or the Red Cross. They are also solicitous of your patient's welfare.

Human nature being what it is, we worry and become more apprehensive with the coming of darkness. Bear this in mind when you return in the evenings to see the patients on your ward. Be alert for the little incidental things you can do for their comfort. Technically, perhaps, this falls into the field of nursing, but when you see an ill patient appearing uncomfortable in bed with his pillows askew, take a few seconds to adjust them for him and give him departing assurance that things will be better for him in the morning. It will do much to allay his apprehension. He may suddenly unburden himself and give you the clue to the cause of his illness.

Do not disregard the observations of nurses and corpsmen. Many an intern has made the correct diagnosis by paying attention to the professional acumen of an observant nurse. The well-trained corpsman is an invaluable aid in the care of your patients. Listen with respectful attention to the observations and opinions of the ward staff; you will be wise to do so.

OATH OF HIPPOCRATES

Hippocrates' oath of over 2,000 years ago has been a guiding light on doctor-patient relationship down through the ages:

"I will follow that system or regimen which, according to my ability and judgment, I consider for the benefit of my patients and abstain from whatever is deleterious and mischievous.

"Whatever, in connection with my professional practice or not in connection with it, I see or hear in the life of men which ought not to be spoken of abroad, I shall not divulge."

In conclusion I should like to leave with you Osler's[7] three personal ideals in medicine:

"To do today's work to the best of one's ability and letting the future take care of itself.

"To cultivate such measure of equanimity as would enable me to bear success with humility, the affection of my friends without pride, and to be ready when the day of sorrow and grief come to meet it with courage befitting a man.

"To act the Golden Rule toward your professional colleagues and toward the patients committed to your care."

REFERENCES

1. AR 40-550 Medical Department Dispensary—General Provisions (16 May 1924).
2. Goldman, G. S.: Psychology of sick call. *Bull. U. S. Army M. Dept.* 6: 71-75, July 1946.
3. Martin, W. B.: Medical approach to patient in Army. *Bull. U. S. Army M. Dept.* 5: 52-56, Jan. 1946.
4. Churchill, E. D.: Standards of military practice in the Army. *Med. Bull., Office of the Surgeon, Hq, 3d Army* 2: 9-16, Apr. 1952.
5. Peabody, F. W.: *Doctor and Patient.* MacMillan Co., New York, N. Y., 1930, p. 49.
6. Alvarez, W. C.: *The Neuroses.* W. B. Saunders Co., Philadelphia, Pa., 1951, p. 70.
7. Osler, W.: *Aequanimitas.* 3d edition. The Blakiston Co., Philadelphia, Pa., 1932; reprinted, 1951. p. 450.

On Polyps of the Large Intestine

I want to bring to you our experience with polyps and some warning. Polyps are often discovered by the gastroenterologist, and they are difficult to find. I would like to urge two things upon you: Never operate on a patient with a polyp that has not been demonstrated roentgenographically at least twice on different occasions, and each time marked with an arrow. If you want to be absolutely sure concerning doubtful ones, roentgenograms should be taken three times, each time marked with an arrow, each time proved to be in the same place, and each time proved to be of the same typical outline.

Let me urge one more thing when removing polyps by colotomy or sigmoidostomy: have the roentgenologist present. The roentgenologist can be a source of great comfort to you. He can interpret roentgenograms in terms of levels of the colon. Not all polyps have long pedicles that can be pulled to demonstrate the dimple. Not all polyps have bodies that are easily defined. I know of nothing which has caused me more chagrin than to have explored for polyps, not be able to find them, have them again demonstrated, reoperate and find them.

There are a few things about polyps that make us suspicious of malignancy Some polyps look as though they were originally pedunculated polyps. When the pedicle has become shortened and broad, we become extremely suspicious that they are malignant, and prepare the patients and the families for radical removal.

— FRANK H. LAHEY, M. D.
in *American Journal of Surgery*, p. 491, Nov. 1953

THE CLINICAL USE OF SUCCINYLCHOLINE AS A MUSCLE RELAXANT

CHARLES F. MOLLER, *Major, MC, USA*
WILLIAM A. WEISS, *M. D.*

SUCCINYLCHOLINE chloride is an ultra short-acting muscle relaxant. Following a single intravenous injection of from 10 mg. to 40 mg. of the drug, muscle relaxation persisted from three to four minutes. Its use is ideally suitable for endotracheal intubation and surgical procedures of short duration. For prolonged relaxation, this drug can be given by a continuous drip technic. Tachyphylaxis did not occur and cumulative action was not observed. The degree of relaxation was controlled by adjusting the rate of flow of the drug, and its termination allowed complete return of muscle tone within five minutes. The quick return of spontaneous respiration was a definite advantage.

CHEMISTRY

This drug is also known as diacetylcholine chloride, because it consists of two molecules of acetylcholine. It is rapidly hydrolyzed in alkaline solution and by the pseudocholinesterase of the plasma. It dissolves readily in water, forming a slightly acid solution. The acid solution is relatively stable and it may be sterilized by autoclaving.

PHARMACOLOGY

Succinylcholine has been classed with the depolarizing muscle relaxants. Its action at the myoneural junction resembles that of acetylcholine. Its first effect on some groups of muscle fibers is a transient stimulation which is rapidly followed by flaccid paralysis due to blockade of the myoneural conduction. Evans and associates[1] stated that succinylcholine inhibits acetylcholine esterase which normally hydrolyzes acetylcholine and rapidly removes it from the motor end-plate region. It thus permits the persistence of acetylcholine which causes a persistent depolarization of the motor end-plates and thereby prevents the passage of the nerve impulses. Succinylcholine is hydrolyzed by the pseudo-

From Valley Forge Army Hospital, Phoenixville, Pa.

cholinesterase of the plasma. Cholinesterase inhibitors such as physostigmine, neostigmine (prostigmine), and tensilon chloride [(3 hydroxyphenyl) dimethylethyl chloride] prolong the effect of succinylcholine.

Fasciculations were more commonly seen when succinylcholine was administered rapidly. As the twitchings subsided flaccid paralysis developed. The muscles of the eyelids are first affected, then those of the jaw, neck, extremities, abdomen, intercostal region, and diaphragm.[2] If the plasma pseudocholinesterase level is normal, recovery from paralyzing doses of the drug begins in about two and one half minutes and is usually complete in 5 minutes.

The administration of doses sufficient to produce complete neuromuscular blockade has not caused any significant change in blood pressure, except for the typical asphyxial pressor response in the absence of adequate respiratory exchange. No evidence of any histamine-like depressor action has been found, thus differing from tubocurarine chloride.

Patients with severe liver disease, severe anemia, and malnutrition may have a decreased plasma pseudocholinesterase activity, which may intensify and prolong the action of succinylcholine, especially if large doses are used. In such patients, the administration of plasma or blood in addition to the use of controlled respiration with oxygen, may assist in restoring cholinesterase activity. Evans and associates[3] demonstrated an inverse relationship between the duration of apnea and the pseudocholinesterase level in the plasma. Unduly prolonged response to the drug should be treated by a transfusion of whole blood, which even after storage contains 30 units of pseudocholinesterase per cc. of plasma.

TECHNIC OF STUDY

This study was carried out on 205 unselected patients varying in age from 16 to 64 years. In most patients premedication consisted of pentobarbital orally, the subcutaneous administration of morphine or meperidine hydrochloride (demerol), and atropine or scopolamine hydrobromide. Induction of anesthesia was carried out by the intravenous injection of 2.5 percent thiopental sodium (pentothal) solution and inhalation of nitrous oxide and oxygen. Ether was added in some instances.

For the purpose of endotracheal intubation, the technic was as follows: A satisfactory depth of anesthesia was established and succinylcholine chloride was given intravenously. Within 60 seconds, the vocal cords were visualized with ease by direct laryngoscopy and an endotracheal tube was inserted. A continuous intravenous drip of a 0.1 percent solution of succinylcholine

chloride in 5 percent dextrose in water was used where the maintenance of muscular relaxation was desired.

RESULTS

The patients were divided into three groups, according to the method and purpose for which the succinylcholine was used. Group 1 consisted of those patients who received a single dose of succinylcholine chloride to permit intubation. Group 2 included those patients who received succinylcholine in a 0.1 percent solution by continuous drip for maintenance of muscular relaxation. Group 3 were the patients who received a priming or intubating dose of succinylcholine plus the continuous drip.

Group 1 had a total of 124 patients. Results were satisfactory in 121 (97.5 percent) and unsatisfactory in three (2.5 percent). Conditions were satisfactory when the degree of muscle relaxation permitted easy introduction of a laryngoscope and exposure of the larynx. Conditions were unsatisfactory when the jaw and neck muscles were not relaxed for laryngoscopy or if prolonged respiratory depression occurred. Ninety-nine (79.8 percent) of these patients received thiopental sodium with nitrous oxide and oxygen, while 25 (20.2 percent) received thiopental sodium with nitrous oxide, oxygen, and ether. The average dose of succinylcholine for intubation was 30 mg.

Of the three patients with unsatisfactory results, one received a dose of 40 mg. of succinylcholine, but had very poor relaxation of the jaw and neck muscles. A second dose of 40 mg. five minutes later produced good relaxation. Endotracheal intubation was then carried out easily. Another patient received two doses, each of 40 mg., three minutes apart but had poor muscle relaxation. He was further anesthetized with ether, and endotracheal intubation was accomplished. Succinylcholine may have been hydrolyzed by the thiopental sodium still in the intravenous tubing in both instances. The third patient had received morphine and scopolamine for preanesthetic medication and had respiratory depression for 45 minutes following thiopental sodium and succinylcholine administration. He subsequently came to surgery at a later date and received meperidine hydrochloride and atropine premedication. After induction with nitrous oxide, oxygen, and ether, succinylcholine was used for intubation. The patient had no respiratory depression. The unsatisfactory response during first anesthesia may have been due to the premedication or the thiopental sodium.

The single intravenous injection of succinylcholine chloride gave jaw and neck muscle relaxation within 60 seconds. With the exception of prolonged respiratory depression in one patient, the effects of the succinylcholine began to subside in three minutes

and apparently had completely disappeared in five minutes. No patient showed any significant blood pressure change.

Group 2 consisted of 16 patients (fig. 1) who received 0.1 percent solution of succinylcholine by the drip method for maintenance of muscular relaxation. This technic was used in those

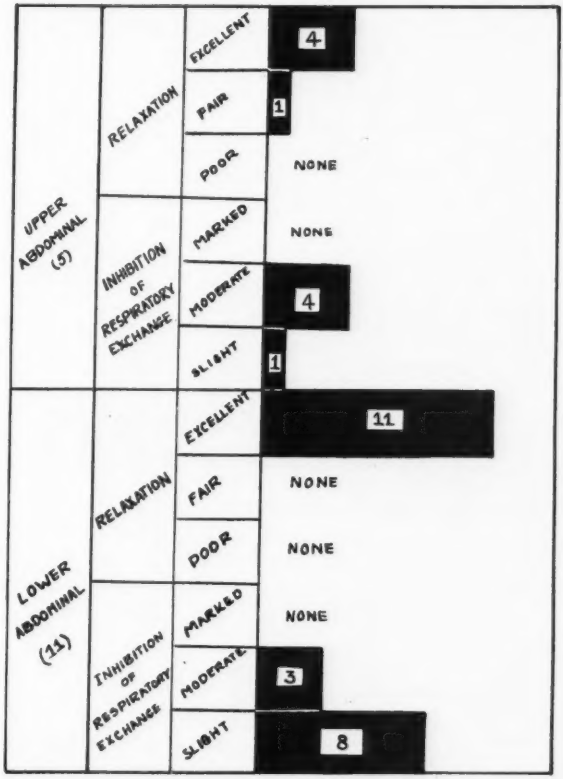


Figure 1. Results obtained with succinylcholine during surgical intervention in the 16 patients of group 2.

patients in whom endotracheal intubation was considered unnecessary; for example, inguinal hernioplasty and small ventral hernial repairs. In 15 patients (93.3 percent) the degree of muscular relaxation was excellent, while in one patient (6.7 percent) it was only fair. Relaxation was considered excellent when the surgery was accomplished with ease and without muscular tension. It was considered fair when the musculature was only partially relaxed and some tension was noted by the surgeon on retraction. Relax-

ation would be unsatisfactory if the degree of muscular relaxation were so poor as to cause interference with the surgical intervention by marked muscle tension on retraction or extrusion of the wound contents.

The rate of administration of the succinylcholine was regulated at 60 drops per minute for the patient who had fair relaxation. The

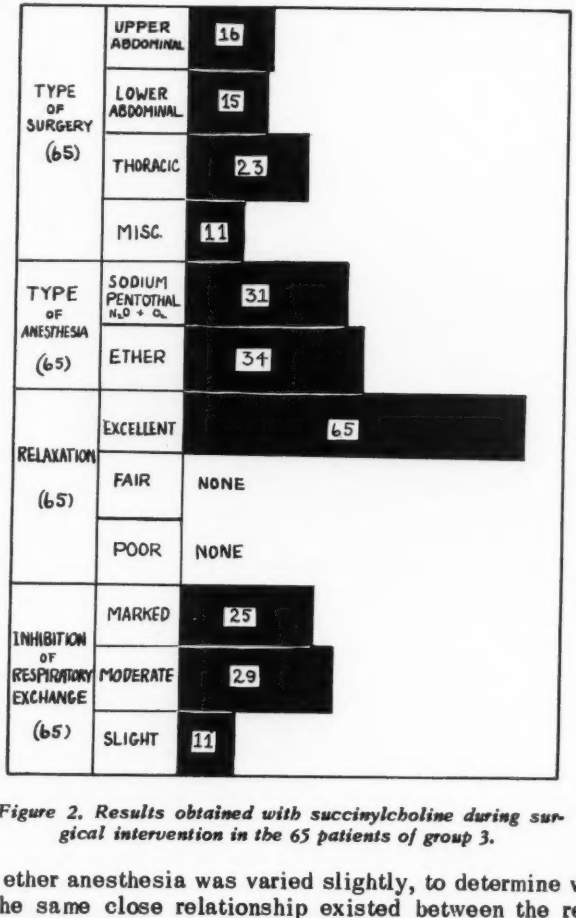


Figure 2. Results obtained with succinylcholine during surgical intervention in the 65 patients of group 3.

depth of ether anesthesia was varied slightly, to determine whether or not the same close relationship existed between the relaxing effects of ether and succinylcholine as between ether and curare. A light plane of ether anesthesia was purposely maintained, but at this level the rate of administration of succinylcholine was inadequate.

In the remainder of group 2, the succinylcholine was administered at an average rate of 60 to 90 drops per minute. Marked inhibition of respiratory exchange did not occur in any patient. The exchange was inhibited to a moderate degree in seven (43.7 percent), and to a very slight degree in nine (56.3 percent). However, the muscle relaxation required in patients of group 2 was less than that required in those of group 3. The more rapid the administration of succinylcholine, the greater the muscular relaxation and the more marked the inhibition of respiratory exchange. The rate of drip was determined by the required degree of muscular relaxation.

Group 3 consisted of 65 patients receiving an intubating dose of succinylcholine plus continuous drip (fig. 2). The operations performed were gastrectomies, cholecystectomies, hysterectomies, colon resections, nephrectomies, and lobectomies. The rate of drip administration of the drug was 90 to 180 drops per minute. Thirty-four patients received maintenance anesthesia with ether and 31 with thiopental sodium, nitrous oxide, and oxygen. Muscle relaxation was excellent in all 65 patients. Of these, 25 (47.6 percent) showed marked inhibition of respiratory exchange, 29 (44.6 percent) had moderate inhibition, and 11 (7.8 percent) had slight inhibition. An apnea or a marked inhibition of respiratory exchange was purposely achieved in most of the thoracic surgical procedures. This was done to reduce movement in the operating field.

In the patients who received maintenance anesthesia with ether, the greater the depth of anesthesia, the slower was the rate of continuous succinylcholine drip necessary for satisfactory muscular relaxation. Adequate respiration was resumed within 4 minutes after the succinylcholine drip was terminated.

DISCUSSION

The rapid onset of action and termination of effect of succinylcholine places this drug in the category of an ultra short-acting muscular relaxant, but apparently without the histamine-like depressor response such as that seen with tubocurarine chloride.

The profound muscular relaxation afforded ideal conditions for laryngoscopy. Little, if any, bronchospasm was seen upon insertion of the endotracheal tube. If the depth of anesthesia was inadequate, bronchospasm and coughing were evident after the succinylcholine had been hydrolyzed.

Large doses of thiopental sodium produce respiratory depression, which at times resembles the apnea of a muscle relaxant. This can be differentiated by exertion of positive pressure on the breathing bag. If inflation of the lungs is accomplished with ease, the muscle relaxant is still effective; if there is some resistance

285934 O—54——5

to inflation, the respiratory depression is probably due to the barbiturates or premedication, or both.

Intubation can be accomplished with the continuous drip if a sufficiently rapid flow of the drug is used, but this increases the volume of intravenous fluids. In some patients this additional volume might be undesirable. Foldes and associates[4] have used a 0.2 percent solution of succinylcholine which resulted in the same degree of muscular relaxation with a slower rate of drip and a smaller volume of intravenous fluids.

If succinylcholine and thiopental sodium are accidentally mixed in the rubber sleeve of the intravenous infusion apparatus, a white precipitate will result. Succinylcholine is slightly acid (pH below 7), while the sodium salts of the barbiturates are alkaline (pH 9 to 10). Succinylcholine is rapidly hydrolyzed and loses its potency if it is mixed with any alkali. Therefore, if thiopental sodium with nitrous oxide and oxygen is the technic of maintaining anesthesia, a separate venopuncture should be used for giving succinylcholine.

The degree of muscular relaxation can be controlled by a variation in the rate of drip, depending on the depth of the anesthesia. The greater the depth of ether anesthesia, the slower was the rate of flow of the drug needed for satisfactory muscular relaxation. The patient must be adequately anesthetized, and the muscle relaxant not used to abolish the motor response to sensory stimuli. Succinylcholine is not an anesthetic agent but is an adjunct.

Rapid onset and short duration of action are the principal advantages of succinylcholine. There is no prolonged period of apnea which always carries the danger of hypoventilation. Decamethonium bromide (syncurine), tubocurarine chloride, or flaxedil [Tri (diethylammoethoxy) benzene triethylioxide] can be used following succinylcholine if time is allowed for the hydrolyzation of the succinylcholine. The reverse is also true. Flaxedil and tubocurarine chloride would be expected to inhibit the action of succinylcholine if the latter is given during the effective period of either. This is because tubocurarine chloride and flaxedil block the depolarizing action. The effect of succinylcholine would be prolonged by decamethonium bromide because this also acts by depolarization. Neostigmine or other anticholinesterase, procaine, and tensilon chloride would also be expected to prolong the effect of succinylcholine.

There was no increase in the incidence of such postoperative complications as atelectasis, paralytic ileus, or pneumonitis in this series over other forms of inhalation anesthesia. There was no mortality associated with the use of this drug.

SUMMARY

In a series of 205 patients, given succinylcholine chloride intravenously, the results indicate that, when given in single injection, this drug produced conditions ideal for laryngoscopy in 97.5 percent of the patients. When used as 0.1 percent continuous maintenance drip, succinylcholine produced excellent muscular relaxation in most patients. The advantages of succinylcholine lie in its prompt and short action and its lack of histamine-like depressor response. It is important to realize that succinylcholine is not an anesthetic agent, but an adjunct for muscular relaxation.

ADDENDUM. Since the original portion of this report was written, succinylcholine has been used in 230 additional patients. Of this number, 123 belong to group 1, with 2 unsatisfactory results (1.6 percent). Thirty-three were in group 2 and 74 in group 3, all with satisfactory results.

REFERENCES

1. Evans, F. T.; Gray, P. W. S.; Lehmann, H.; and Silk, E.: Sensitivity to succinylcholine in relation to serum-cholinesterase. *Lancet* 1: 1229-1230, June 12, 1952.

2. Mayrhofer, O. K.: Self-experiments with succinylcholine chloride; new ultra-short-acting muscle relaxant. *Brit. M. J.* 1: 1332-1334, June 21, 1952.

3. Evans, F. T.; Gray, P. W. S.; Lehmann, H.; and Silk, E.: Effect of pseudocholinesterase level on action of succinylcholine in man. *Brit. M. J.* 1: 136-138, Jan. 17, 1953.

4. Foldes, F. F.; McNall, P. G.; and Borrego-Hinojosa, J. M.: Succinylcholine: new approach to muscular relaxation in anesthesiology. *New England J. Med.* 247: 596-600, Oct. 16, 1952.

Endocrine Therapy in the Menopause

One of the greatest abuses of endocrine therapy is in the management of the menopausal vasomotor symptoms. Most of these women need no estrogen therapy at all. All that we can aim to do with estrogens is to tide the patient over certain little symptomatic bumps that she experiences during the period of transition. The majority of women can readily tolerate these symptoms, and they are much better off to be given no estrogen at all and get the readjustment over with. But if we keep pumping into these women the very substance that their economy is trying to get along without, we only prolong the menopause. You all have seen women who have been given "shots" for many years, which is never necessary. Those are the women we have to think about in connection with cancer.

—EMIL NOVAK, M. D.
in *Rhode Island Medical Journal*,
p. 573, Oct. 1953

MEDICAL CONSIDERATIONS IN HELICOPTER EVACUATION

SPURGEON H. NEEL, Jr., *Lieutenant Colonel, MC, USA*

HELICOPTER evacuation of the seriously wounded from the forward combat area is a sound and feasible medical practice. It has been battle tested in Korea and subjected to formal field testing within the zone of the interior. While current organizational structure and various helicopter models are still under evaluation, it is generally accepted that ambulance helicopters, under the control of the Army Medical Service, will contribute materially to the medical service of any future military operation.

Battle and training experiences have indicated a requirement for more understanding regarding the role of helicopter evacuation within the over-all medical effort in forward combat areas. Full exploitation of the capabilities of helicopter evacuation depends upon a sound understanding of the medical and tactical considerations involved. The surgeon who best understands the principles and procedures utilized in helicopter evacuation can best exploit its capabilities in the care of the individual casualty and the command. The basic procedures used in helicopter evacuation are prescribed in Department of the Army Training Circular Number 32, 1952. Ground assistance required for helicopter operations is described in Department of the Army Training Circular Number 22, 1952. Tactical considerations in helicopter evacuation will be the subject of a separate article. Organizational and developmental matters are, likewise, beyond the scope of this discussion.

Air evacuation, under the control of the United States Air Force, has been proved the primary and best means of moving casualties between the combat zone and the communications zone or the zone of the interior. Normal air evacuation is used after the casualty has been moved into the army service area and has received initial surgical intervention. In the forward combat area, however, the majority of casualties will continue to move by surface evacuation.

From U. S. Army Medical Field Service School, Fort Sam Houston, Tex. Col. Neel now at Headquarters, 30th Medical Group, APO 301, San Francisco, Calif.

With the advent of helicopter ambulances, air evacuation has been pushed steadily forward until it is now available within the regimental area. Every field surgeon is now concerned with air evacuation and must appreciate its capabilities, limitations, and procedures, and, most of all, his own responsibilities. Helicopter ambulances are but auxiliary means of evacuation. They supplement, but do not replace in any way, conventional surface means of evacuation. Helicopter ambulances afford the forward surgeon greater speed, flexibility, and selectivity in evacuation but he must realize that he has accrued many new responsibilities with helicopter evacuation.

The advantages, or capabilities, of helicopter evacuation can be considered under five major headings: (1) speed in evacuation, (2) flexibility of medical service, (3) patient comfort, (4) selective evacuation, and (5) economy. All of these factors reduce the mortality and morbidity of the individual casualty, and improve the medical practices within the command. An understanding of these considerations will facilitate exploitation of helicopter evacuation and the better integration of its capabilities into the over-all medical support of the command.

SPEED IN EVACUATION

Speed in evacuation is most important in the severely wounded. Casualties are a "perishable commodity." They cannot be "stockpiled," but must receive proper treatment as early as possible. A man dies in so many minutes, not over a distance of so many miles. Any measure that will reduce the time lag between wounding and treatment will reduce both the mortality and morbidity of war wounds. The ambulance helicopter gives more rapid evacuation in two specific ways. Its speed over unfavorable terrain permits the rapid evacuation of casualties from the forward pick-up point to a medical facility capable of initial surgery anywhere within the army service area. This, in effect, places all hospitals and special treatment centers in direct support of the regimental or battalion surgeon. Secondly, the minimum landing site requirements of rotary-wing aircraft permit their use well forward.

A basic principle of field medical service is flexibility, which is enhanced by the use of helicopter ambulances. The speed and range of rotary-wing aircraft and their minimum landing site requirements permit their concentration whenever and wherever required. Thus, the controlling surgeon can quickly shift his evacuation means to support any unit which is becoming immobilized with severely wounded casualties. The surgeon now has the capability of evacuating and providing limited medical resupply to units which are isolated by enemy action or terrain.

The importance of flexibility of medical service is increasing with the advent of new "mass destruction" weapons and the tactical concept of defense on a wide front with small, relatively isolated units.

Comfort of the patient is not merely a luxury. Antitraumatic evacuation is essential if shock is to be prevented or minimized. Proper preparation of the casualty for evacuation is as important when using helicopters as any other evacuation means. With helicopter evacuation, the casualty not only reaches the proper treatment facility faster, but also in much better condition. Helicopter evacuation is in no sense a form of treatment, but it is a valuable adjunct to subsequent surgical intervention in that it moves the casualty to the surgeon in the shortest period of time and in the best possible condition.

SELECTIVE EVACUATION

Selectivity in evacuation is less obvious than the other factors listed and bears further consideration. Evacuation is no longer limited so that all casualties must move to the particular hospital supporting the major tactical command. The speed, range, and flexibility of helicopter evacuation permit the removal of the casualty to the treatment facility best equipped and staffed for his particular type of wound. The effectiveness of this procedure depends on helicopter ambulances remaining under medical control and the co-operation of forward surgeons in providing adequate clinical information.

Economy may sound paradoxical when one considers only the cost of the individual helicopter ambulance. Actually, the proper use of helicopter evacuation permits considerable economy in medical means. Specialized personnel can now be concentrated in designated treatment facilities located well forward in the combat zone and there is no need for equipping and staffing every forward hospital for the care of every type of casualty. More and better surgery can be provided with less personnel. When one considers the value of the individual soldier, including both his military and subsequent civilian contribution, the true economy of saving a life becomes obvious.

These five basic advantages of helicopter evacuation bear analysis by all concerned with the use of the helicopter ambulance, but particularly by the field surgeon due to his key role in forward air evacuation. Full use of helicopter evacuation depends on the intelligent co-operation between the medical officers located in forward installations and the pilots of ambulance helicopters.

A brief consideration of the limitations of forward helicopter evacuation will assist the field surgeon in maintaining a proper perspective. The helicopter ambulance is no panacea. Most limitations can be minimized if they are understood and steps are taken to circumvent them or prevent undue interference with forward medical support. The limitations of the ambulance helicopter can be considered under four general headings: (1) cost, (2) maintenance requirements, (3) sensitivity to weather and darkness, and (4) tactical integration.

The cost of each ambulance helicopter will constitute a limitation on the number that will be available to the Army Medical Service. The H-13 aircraft, which transports two litter patients externally, costs about $34,000. The H-25 aircraft, which transports three litter patients internally, costs about $340,000.* Compare these figures with the $4,621 that will buy a field ambulance capable of transporting five litter patients. High skill and training requirements of pilots and maintenance crew contribute even further to the expense. The cost can be minimized by insuring that ambulance helicopters are used with maximum efficiency and that they are reserved for emergency evacuation of severely wounded casualties requiring immediate initial surgical intervention or routine evacuation from isolated military units where other means of evacuation are not feasible. The helicopter, like any other type of aircraft, is of value only when flying. Delay at either terminus in air evacuation, whatever the cause, increases the relative expense of the aircraft by wasting its usefulness. Lack of information in request for a helicopter and slowness in loading procedures are the most common sources of delay in helicopter evacuation.

In Korea the ratio of maintenance time to flying time was found to be about 6:1. While maintenance is not strictly a medical problem, field surgeons should appreciate its requirements when projecting the use of helicopter evacuation for a particular operation.

Helicopters are very sensitive to weather and darkness. Instrument equipment is limited, and the pilots normally fly VFR (Visual Flight Rules) which preclude their use when ceiling or visibility are below minimum standards. Night evacuation missions are rarely flown. Only when there is a most urgent need, when the pilot has previously entered the area, and when the landing site can be lighted can pilots safely execute night evacuation missions. This requires the maintenance of an effective surface evacuation system. Provision must be made for

*Price based on minimum quantity orders.

initial surgery well forward within the reach of surface evacuation to cover those periods when helicopter evacuation is not available.

TACTICAL INTEGRATION

Helicopter evacuation poses many problems which are new to the Army Medical Service. A full discussion of these problems is being made the subject of a separate article, but the field surgeon should realize their impact on medical practices in the forward combat area. While most of these considerations are nonmedical, the field surgeon must know all the factors which influence the care and evacuation of casualties to develop sound forward medical practices. Among the problems inherent to integration of helicopter evacuation are: site selection and marking, control of aircraft in flight, visual and electronic air-ground communications, co-ordination of supporting fires with helicopter sorties, preservation of concealment of forward medical and tactical installations, and safety.

The surgeon exercising detailed control of helicopter sorties receives evacuation requests through medical channels over "common user" electronic facilities. Each request contains appropriate clinical information on each casualty plus data on the place and time pickup is desired, the marking of the site, and required tactical information. Each intervening surgeon has screened the request and established priorities where indicated. Based on this information, the surgeon exercising operational control over helicopter evacuation dispatches individual helicopters with instructions as to the proper destination of casualties. These are medical decisions, and can be made only by those with sufficient training and experience.

SELECTION OF CASUALTIES

The selection of casualties for helicopter evacuation is normally the initial problem confronting the field surgeon using helicopter ambulances. Considerations involved include: (1) the nature and severity of the casualty's condition, (2) the availability of helicopters for evacuation, (3) the number of casualties requiring expeditious evacuation, and (4) other means of evacuation available.

The following types of casualties should be evacuated by ambulance helicopter to the nearest medical facility capable of the type of initial surgery required:** (1) casualties in shock, who have been in shock, and those with continuing hemorrhage; (2) all traumatic amputations; (3) open fractures of long bones, complicated by shock or hemorrhage, or without complete and

**Extracted from addresses presented 19 and 30 April 1951 at Army Medical Service Graduate School, Washington, D. C., by Howard E. Snyder, M. D.

comfortable immobilization; (4) wounds of the extremities with impaired blood supply, or with a tourniquet in place, or with history of tourniquet application; (5) wounds with extensive muscle damage; (6) abdominal wounds; (7) all sucking chest wounds; (8) chest wounds in which there is any degree of respiratory difficulty or dyspnea; (9) all thoracicoabdominal wounds; (10) maxillofacial or neck wounds that are severe or in which there is respiratory difficulty; (11) head injuries in coma with signs of increased intracranial pressure; and (12) suspected gas gangrene. These are the same type of casualties that are eligible for initial surgery in the mobile army surgical hospital when helicopter evacuation is not available.

There will rarely be sufficient helicopters to evacuate all these casualties. The medical officer must, in each case, decide which of the more seriously wounded are to be evacuated by helicopter and which by field ambulance. This is a matter of clinical judgment, and "rules of thumb" are not only useless, but dangerous. When making such decisions, the surgeon considers the time separating his installation from the mobile army surgical hospital. It is poor medical practice to delay unduly the evacuation of a casualty pending availability of a helicopter ambulance when it is feasible to expedite his evacuation by field ambulance.

Any casualty that is at all transportable is transportable by helicopter. The low altitudes and short flights characteristic of helicopter evacuation permit transportation of casualties who might be unsuitable for evacuation in fixed-wing aircraft. The principal limiting factors in air evacuation are altitude pressure changes and, to a lesser degree, anoxia. Neither of these two limitations is significant in helicopter evacuation.

PREPARATION OF PATIENT

In the preparation of casualties for helicopter evacuation, hemorrhage must be controlled and treatment for shock must be instituted and continued while waiting for the arrival of the helicopter ambulance. The casualty should have a systolic blood pressure of at least 80 mm. Hg and an adequate airway must be established. Prior to take-off, the casualty's tracheobronchial tree should be emptied of any blood or mucus. Those with severe maxillofacial injuries should be evacuated in a prone position to prevent aspiration of vomitus in event they should become air sick. Rarely, tracheotomy may be indicated. Fractures should be immobilized and adequate sedation should be given to reduce pain and shock. Open chest wounds, whether sucking or not, should be tightly bandaged. In short, all possible medical care should be given the casualty prior to take-off without delaying his evacuation.

Limited medical treatment can be continued in flight if the casualty is evacuated in cargo-type helicopters. These helicopters may carry a medical attendant in addition to the pilot, who is also a qualified medical assistant. It must be realized that, although helicopter ambulance pilots are qualified medical assistants, their medical function in flight is limited to judgment because they are too occupied flying the aircraft to devote any direct attention to casualties. If treatment is to be continued in flight, detailed instructions should be given to the medical attendant. Active medical care in flight is impracticable when casualties are evacuated in utility type helicopters such as the H-13 because the casualty is carried on external litter racks.

Helicopter evacuations normally terminate in evacuation hospitals. Use of an evacuation hospital rather than a mobile army surgical hospital as the rear terminus for helicopter evacuation is preferable because transportation of casualties from the regimental area to a properly located mobile army surgical hospital (within the division area) does not fully make use of the speed, range, and flexibility of helicopter evacuation. The capacity of the mobile army surgical hospital should be conserved for severely wounded casualties which exceed the capabilities of available helicopter evacuation. At night and during inclement weather it is advantageous to have beds and medical personnel ready in the mobile army surgical hospital to care for all casualties pending the resumption of helicopter evacuation support. In Korea, the rear terminus for helicopter evacuation was the mobile army surgical hospital but there, until late in the campaign, the mobile army surgical hospital usually functioned as an evacuation hospital and was located from 30 to 60 miles behind the line of contact. This validated the procedure recommended rather than being an exception.

The helicopter ambulance, like any other ambulance, is capable of limited medical resupply. Whole blood, plasma, biologics which have extreme storage requirements or short expiration dates, and other urgently needed medical items are advantageously distributed by air. Routine evacuation of tactical units isolated by enemy action or terrain can be done effectively by helicopter. River crossing and amphibious operations are good examples of this latter use. The ferrying of patients from army medical installations to U. S. Navy hospital ships located off-shore is another effective use. Helicopters afford considerable flexibility in meeting unforeseen medical requirements in rear areas such as are incident to area damage control operations.

SUMMARY

The helicopter ambulance has won a place in the Army Medical Service. It is not contemplated that helicopters will ever be available in sufficient quantities to replace conventional surface means of evacuation, nor that such would be desirable. The role of the helicopter ambulance is that of an auxiliary means supplementing, but not replacing, field ambulance evacuation in the forward combat area. Helicopter ambulances must be under medical control to achieve the selectivity in evacuation that is inherent to utilization of helicopter evacuation. The field surgeon must understand the capabilities and, even more important, the limitations of helicopter evacuation. He must accept his own responsibilities as a member of the ground-air team that is essential to the full value of forward air evacuation. It is not a matter of whether the Army can afford to use helicopter ambulances but more a matter of whether we can afford *not* to use them.

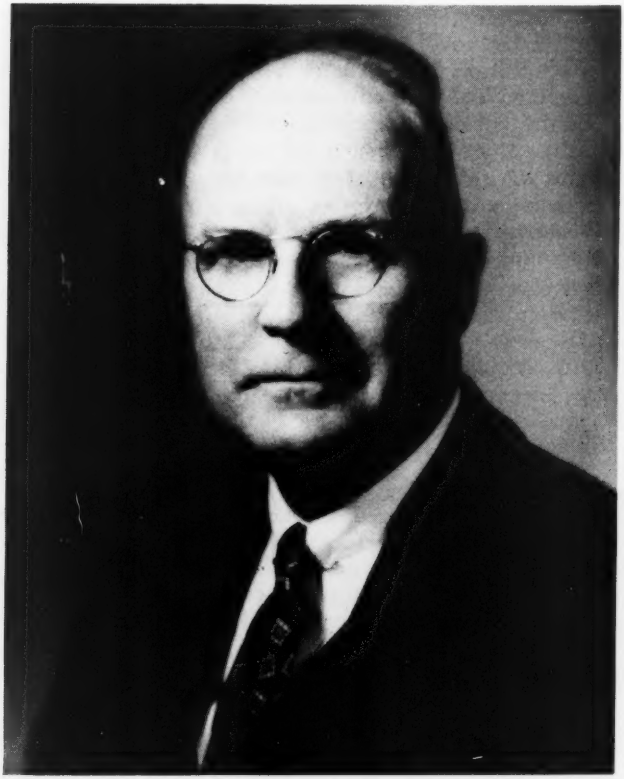
The Unconscious Patient

Adequate care of an unconscious patient is a time-consuming, meticulous task, demanding the best efforts of both physicians and nurses. This is becoming more evident with the mounting number of malpractice suits and the quickening of public attention to any indication of neglect. The cause of unconsciousness is immaterial. Diabetic and uremic coma, cerebral vascular accidents, head injuries, brain tumors, and even relatively normal individuals during anesthesia present similar problems in care. More often than not, the very survival of such patients depends upon the type of treatment which they receive.

The most important single factor in the success of such management is the state of mind of the physician and nurse in charge. Unconscious patients are utterly helpless. They are unable to warn their attendants of muscle strain, joint trauma, eye injury, overdistention of the bladder, or tracheal obstruction. They feel no pain and would be unable to show any indication of it even if they did. The doctor, therefore, must constantly be alert to possible injury, as well as to the needs of their nutritional and metabolic functions.

—From an editorial in *GP*, p. 29, Sept. 1953

Dr. Frank B. Berry Named Successor to Dr. Casberg



Frank Brown Berry, M. D., F. A. C. S., Professor of Clinical Surgery at Columbia University College of Physicians and Surgeons, has been chosen to succeed Melvin A. Casberg, M. D., as Assistant Secretary of Defense (Health and Medical). Dr. Berry served as a medical officer in both World Wars and is a reserve brigadier general in the Medical Corps of the Army. He is a graduate of Harvard Medical School and a founder member of the American Board of Surgery and of the Board of Thoracic Surgery. Since July 1946 he has served as a national consultant in his specialty to the Surgeon General of the Army, and since 1948 has been a member of the Committee on Medical Sciences, Research and Development Board.

INTRA-ARTERIAL TRANSFUSION

SAM F. SEELEY, *Brigadier General, MC, USA*

ON admission to the emergency room or the forward surgical hospital near the battlefield, patients suffering from shock can rarely be subjected to scientific measures designed to determine the degree of blood or plasma loss. There are no laboratory devices which are capable of measuring rapidly either the blood volume or the degree of vasoconstriction which reduces the capacity of the vascular space. When profound shock is present, it is necessary to bring about prompt resuscitation by adequate replacement either with blood alone, or with blood and plasma, or plasma expanders. During World War II a sufficient amount of blood was available to resuscitate those in moderate shock due to massive tissue destruction or marked blood loss. Even at that time, pressure transfusion was rarely used. Special research in Korea, where pressure transfusions have been used, further demonstrated that in patients with massive wounds involving bone and muscle, from 20 to 30 pints of blood have been required to bring about resuscitation for reparative surgery, and to sustain the circulation during the early hours of recovery.

Successful replacement of blood volume loss depends on the speed of administration as well as the adequacy of replacement. Administration of large quantities of blood under pressure by the venous route will suffice in the majority of instances when the heart beat is discernible. When the blood pressure cannot be ascertained or is very low, and even in instances when it is certain that the heart is not beating, successful resuscitation has been accomplished by intra-arterial blood transfusion. To bring about tissue perfusion of the viscera, skeletal structures, and the myocardium, it is necessary that an optimal pressure be maintained in the major arterial vessels. Resuscitation of the excised mammalian heart was reported by Langendorff in 1895 by perfusion of the aortic stump with normal saline solution under pressure. Kuliabko, in 1902, restored the contractions of the excised heart of a three-month-old child, 20 hours following death, by aortic perfusion with defribinated oxygenated blood. In the

From Walter Reed Army Hospital, Walter Reed Army Medical Center, Washington, D. C. Presented at the annual meeting of the American Medical Association, New York, N. Y., 4 June 1953.

Gen. Seeley is now at Headquarters, U. S. Army, Europe, APO 403, New York, N. Y.

absence of the heart beat, blood given by the venous route cannot be carried by the right heart through the pulmonary tree. Applying this principle, Glasser and Page[1] bled 39 animals until breathing stopped for an average of five minutes and the heart beat stopped for two minutes. Intra-arterial administration of blood resuscitated 84 percent of the animals; 51 percent survived for an average of 10 hours; and 33 percent recovered.

Since the early reports on intra-arterial transfusion, many articles reporting the dramatic resuscitation of patients whose recovery would be doubtful if intravenous transfusion alone had been employed, have appeared in the literature. However, some clinicians are using intra-arterial transfusion where this method is not indicated. In patients in mild or moderate shock due to blood loss, transfusions by the venous route suffice. In patients in profound shock, the rapid resuscitation that follows intra-arterial transfusion makes it possible to switch to the venous route for the completion of resuscitation and the maintenance of blood volume in the presence of moderate continuing hemorrhage. When severe hemorrhage has not been brought under control, continued administration of large amounts of blood by the arterial route may be necessary.

It has been my experience that arterial transfusion should be employed in profound shock when the pulse and blood pressure are not obtainable or in moderate or profound shock when pressure transfusion by the intravenous route is failing.

CHOICE OF ARTERY

Any artery large enough to accommodate a 15-gage needle or arterial cannula is suitable. The most accessible artery nearest the aorta is preferable. While the radial artery is most frequently chosen, congenital absence of deep palmar arch anastomoses may result in gangrene of the hand if that artery is sacrificed. The radial artery should not be ligated. If the brachial or femoral arteries are used, the application of a tourniquet distal to the site of transfusion reduces pain and vasospasm in the extremity and avoids the enforced perfusion of blood with a low oxygen content. An extremity will survive with the application of a tourniquet, if the period of time does not exceed that necessary in orthopedic operations under tourniquet control.

If a laparotomy is performed, the aorta is a favored site for intra-arterial blood transfusion. In a thoracotomy, the thoracic aorta may be used. Transfusions have been given into the left ventricle. In Korea it was found that an excellent site is any major artery exposed in severe wounds of the extremities.

SPEED OF TRANSFUSION

Blood should be given by the arterial route at a speed sufficient to bring about prompt filling of the arterial system. As the circulation improves and arterial blood is carried forward in the circulation and vasoconstriction relaxes, transfusion may need to be continued until the entire circulatory system has become filled. Pressure cannot be developed within the arterial system until a sufficient amount of blood has been given to exert pressure against the walls of the great vessels. This is comparable to an elastic fire hose which must be filled completely before pressure can be exerted on the nozzle. Speed of transfusion is dependent upon the caliber of the needle and the pressure exerted on the column of blood. A 15-gage or larger needle or cannula should be used. Pressure of from 200 to 300 mm. Hg under these conditions will permit the administration of large quantities of blood in a short time.

AMOUNT OF BLOOD GIVEN

Sufficient blood must be given to build up a pressure gradient within the major arteries. This must be followed by a sufficient amount to maintain adequate perfusion pressure within the arterial system after vasorelaxation has occurred. It is my custom to use the arterial route until the pulse rate has been reduced to 120 or less per minute, or the systolic blood pressure has reached 80 mm. Hg—whichever occurs first. If, at this time, constriction of peripheral veins has relaxed and the venous route can be employed, intra-arterial transfusion is delayed by equalizing the pressure in the transfusion apparatus with that of the patient's systolic pressure, but leaving the needle in place. If intravenous transfusion then proves adequate, the arterial needle is withdrawn.

SUBSTANCES USED

Under grave emergency conditions, I have employed normal saline solution or dextrose solution pending the arrival of plasma expanders, plasma, or blood. While whole blood is most desirable, occasionally substitutes must be used to maintain life until blood is procured.

COMPLICATIONS

Air embolism is the greatest hazard in intra-arterial transfusion. This can be prevented by exercising care to prevent the egress of air into the circulation. A pressure bulb should never be attached to the transfusion apparatus unless a responsible person is in constant attendance. The threat of air embolism may be

overcome by the use of elastic bags containing blood but no air. Pressure is exerted onto the bag by placing it under the patient's buttocks or back, thus forcing the blood into the patient's arteries.

Gangrene may develop at a point distal to the site of intra-arterial blood administration. To prevent gangrene, arterial transfusion should be continued only to the point where venous administration will suffice. The closer to the aorta the blood is administered, the less is the threat of gangrene. Application of a tourniquet, as described, is helpful.

SUMMARY

Intra-arterial blood transfusion is effective in resuscitating patients in profound shock. It should be employed promptly, administered rapidly, and discontinued as soon as it is found that the intravenous route of administration will sustain the circulation. Pressure perfusion of the great vessels may be helpful in restoring the heart beat in cardiac arrest. A nonbeating heart cannot be expected to transfer blood from the venous side across the pulmonary system to the aortic arch. A pressure head at the coronary vessels is mandatory if the myocardium is to be restored to activity.

DISCUSSION

Captain Robert B. Brown, MC, USN: There can be no argument with the statement that administration of adequate amounts of blood by the intra-arterial route is effective in treating profound hypovolemic shock. Neither is there any doubt that the current definition of "adequate" in referring to blood replacement has been so upgraded by recent experience in Korea as to be almost unbelievable.

Many different mechanisms have been proposed to explain an apparent superiority of the intra-arterial over the intravenous route in the transfusion of patients in profound shock. This is neither the time nor place to enter into the argument as to whether these contentions have ever been supported by conclusive proof that such is true, if equal volumes of blood are given in like periods of time by the two routes. The invitation to discuss General Seeley's paper on intra-arterial transfusions stimulated an enquiry on my part among some of my colleagues into actual usage of the procedure, not only in our own institution, but in other naval and civilian hospitals.

The data in table 1 indicate a low ratio of intra-arterial transfusion to total number of blood transfusions in the hospitals that replied to my questionnaire.

The sites of administration of the intra-arterial transfusions were as follows: The radial artery was used most frequently and usually by the "cut-down" technic. Occasionally the femoral artery was used, percutaneously. The brachial artery was used once and the aorta on occasions when it was exposed.

TABLE 1. *Intra-arterial transfusions given in 1953*

Institution	Number of intra-arterial transfusions	Total number of blood transfusions (all types)
1. Civilian Hospital No. 1	3	9,000*
2. Civilian Hospital No. 2	24	4,685*
3. Civilian Hospital No. 3	5	720
4. U. S. Naval Hospital No. 1	0	–
5. U. S. Naval Hospital No. 2	8	4,141
6. U. S. Naval Hospital No. 3	6	2,879*

*Units of blood rather than total number of transfusions.

Indications given for choosing the intra-arterial over the intravenous route for administering the transfusions were: (1) hemorrhagic or traumatic shock not responding to intravenous transfusion; (2) blood loss too rapid for intravenous replacement; (3) maintenance of blood pressure during extensive surgical operations on severely injured or exsanguinated patients; (4) profound shock associated with one case each of mesenteric thrombosis and acute pseudomembranous enterocolitis; and (5) shock associated with right-sided heart failure and pulmonary edema. One cannot but question the second indication because extremely rapid replacement of blood is possible, if a pressure setup is used on the venous side. In most instances the third objective can be accomplished by prompt and adequate intravenous transfusion. In the patients with extensive mesenteric thrombosis and acute pseudomembranous enterocolitis the blood pressure was elevated in each instance by the intra-arterial transfusion, but as soon as the latter was discontinued the pressure fell and the patient died. In general, intra-arterial transfusions given for the

285934 O—54——6

above-listed indications were successful. Complications were a cyanotic and painful hand in one patient and a fatal case of congestive atelectasis ("liver lung"). The patient who died as a result of congestive atelectasis did so after receiving about 30 units of blood, many of which had been given intravenously, so that the complication cannot rightly be attributed to the intra-arterial route alone.

Of what significance are these data? It is not implied that these facts on the actual usage of intra-arterial transfusion settle the very stimulating controversy centering about the procedure, but they do strengthen my own opinions on the subject, which may be summarized as follows: Intra-arterial transfusion is a very effective means of treating profound hypovolemic shock. The need for intra-arterial transfusion however, should be, and is, infrequent if blood replacement by the intravenous route is prompt and adequate. Intra-arterial transfusions are being justified in many instances on the basis of indications which are open to question. Although complications are not commonly encountered when intra-arterial transfusions are given with proper precautions, they are too frequent and serious to justify the procedure on any but strong indications such as those set forth by General Seeley.

REFERENCE

1. Glasser, O., and Page, I. H.: Experimental hemorrhagic shock; study of its production and treatment. *Am. J. Physiol.* 154: 297-315, Aug. 1948.

Research in Science

To plan, direct, and do good research you *must* frequently think well ahead of existing knowledge. Occasionally it is known to everyone that a great goal has *not* been reached and the literature may be ignored, but the individual who follows this path more often attains oblivion than fame. When a real advance has been made it is a relatively short time before the weight of interest and ability of other laboratory groups force the originators to share or relinquish leadership. This is as it should be, and there will always be hosts of glittering new problems for those who can never be completely happy unless they are venturing into some phase of the unknown. It is more exciting to tackle a problem and, if fortunate, to enjoy for even a brief space the thrill of a new trail, than to develop well-established fields—but the latter course may be much more productive. As long as an investigator can continue to attract young minds and to keep his own open to the myriad opportunities which lie ahead in research, there is scope—and hope—for him.

—CHARLES H. BEST, M. D.
in *Annals of Internal Medicine*, p. 434, Sept. 1953

ACUTE ANTERIOR POLIOMYELITIS IN THE NAVY

SIDNEY A. BRITTEN, *Commander, MC, USN*

IN a previous article[1] it was concluded that: (1) there is little likelihood of the spread of clinically apparent poliomyelitis in ships and stations even after the appearance of two cases within five days, (2) it is improbable that large amounts of gamma globulin would be required for prophylactic use, and (3) there is no well-established justification for routine inoculation of personnel attending patients, providing communicable disease precautions can be observed. To test these conclusions, the incidence of poliomyelitis in all U. S. Navy ships and stations for the calendar year 1952 was reviewed. As in the previous study, the source of the statistical data presented is a tabulation of new cases on the Individual Statistical Report of Patient, NavMed-F.

Poliomyelitis outbreaks occurred at only 107 (5.6 percent) of about 1,900 ships and stations submitting morbidity reports during 1952. As in the two preceding years, the occurrence of multiple cases was not the rule. Seventy-four percent of the outbreaks consisted of a single recognized case, of which 21 percent were of the nonparalytic type (table 1). Among the activities reporting only one case were nine large air bases, three hospitals, three receiving stations, and one recruit training center. This suggests that size of population was not a controlling factor in the development of multiple case outbreaks in 1952. Included in this group also were 25 ships in which, in spite of intimate living and working conditions, circumstances were apparently unfavorable to recurrence of clinically evident infections.

The intervals shown in table 2 were chosen because they represent the periods during which passive immunizations are expected to be ineffective, effective, or partially effective in preventing the occurrence of cases, when administered to family contacts or as mass prophylaxis during an epidemic.[2-4] If the period of significant protection afforded by 0.14 cc. of gamma globulin per pound of body weight is taken to be the second through the fifth week, and if diminishing protection is afforded through the eighth week, then only 17 paralytic cases might have

From Bureau of Medicine and Surgery, Department of the Navy, Washington, D. C.

been prevented or rendered less severe if gamma globulin prophylaxis had been administered to all susceptible contacts following the appearance of one confirmed case at each of 107 activities, many of them large and many with intimately intermingled personnel.

TABLE 1. *Outbreaks of poliomyelitis according to number of cases, paralytic and nonparalytic, U. S. Navy and Marine Corps, 1952*

Outbreaks		Type of case		
Type	Number	Total cases	Paralytic	Nonparalytic
Single case	79	79	62	17
Two cases	14	28	18	10
Three or more cases	14	76	55	21
Total	107	183	135	48

A total of 38 patients with paralytic disease were admitted at eight stations that reported multiple case outbreaks. If gamma globulin had been administered to contacts after the appearance of two cases within a five-day period, the total could have been reduced by not more than eight patients.

TABLE 2. *Interval between first and subsequent cases in 28 multiple case outbreaks, U. S. Navy and Marine Corps, 1952*

Interval between first and subsequent cases (days)	Number of subsequent cases	
	Paralytic	Nonparalytic
0 - 6	6	–
7 - 34	17	7
35 - 55	–	5
56 or more	26	17

Thirty-one percent of all the cases were reported from three rather small circumscribed areas in the United States. These are shown in table 3. Cases were being reported by the civilian health agencies, and in general when the incidence was highest in service activities, it was also highest in the cities in the vicinity. All except three of the 20 continental Navy and Marine

Corps stations where multiple case outbreaks occurred were located near cities where poliomyelitis was prevalent and recorded.[5] The failure of confirmed poliomyelitis to occur in multiple case outbreaks in most of the ships and stations suggests the possibility that a significant number of the cases among service personnel originated in sources outside their stations of duty. This becomes a prominent consideration bearing upon use of prophylactic measures.

The 1952 experience appears to indicate that specific prophylactic measures should be applied before the first case is detected on a ship or station, if the incidence of poliomyelitis is to be substantially reduced by such means. In view of the short duration of protection afforded by gamma globulin and the scanty supply, practical considerations limit prophylactic measures to vaccines, which are still in the experimental stage of development.[6-8]

Table 4 indicates that specific rates for officers were higher than for enlisted men. This is not easily explained by an hypothesis of dissemination of poliomyelitis within a ship or station and suggests a search for family exposure, a project beyond the scope of this study.

Rates among enlisted personnel are uniform except for medical and dental enlisted men. The higher rates for this type of personnel held true in 1950 and 1951. Statistical analyses show that the difference in rates each year could be expected to occur frequently due to chance alone, yet because the difference is consistent through the three-year period, the possibility that it may be of some significance remains to be excluded. Besides the exposure to infection that Hospital and Dental Corps personnel have in common with other enlisted persons on and off station, exposure to patients, known or unknown, is likely to be more frequent.

In view of the intimate nursing care that patients with paralytic poliomyelitis require, administration of prophylactic injections of gamma globulin to medical department personnel caring for such patients in hospitals has been proposed frequently. In 1952 only one hospital corpsman was admitted from each of three naval hospitals; the remaining five were admitted from individual ships and stations. Although the association of cases among such personnel with the care of patients cannot be excluded, it would appear that hospital duty was not sufficiently hazardous to produce recognized epidemics among attendants of patients. If all eight cases were to have been prevented, administration of gamma globulin would have had to have been quite general and well beyond limits of practicability. Certainly the administration of this preventive measure only to hospital personnel would not have strong justification.

TABLE 3. *Monthly incidence of poliomyelitis in selected continental and in adjacent cities, Navy and Marine Corps Stations, 1952*

Area	Month (1952)												
	Total	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
San Diego-Long Beach-Los Angeles													
Civilian incidence	692	14	18	9	8	15	30	33	103	129	133	146	54
Naval incidence	43				2	3	2	2	6	9	5	7	7
Receiving Station, San Diego	2					1						1	
Camp Pendleton Activities, Oceanside	11							3	2	2	4		
Marine Corps Recruit Depot, San Diego	3				1		1						1
Naval Training Center, San Diego	12				1				2	3	3		3
Naval Air Station, San Diego	8					2	1	1	1	1		1	1
Other stations with only one case	7							1		3		1	2
San Francisco-Oakland													
Civilian incidence	317	3	3	3	1	5	8	5	28	51	49	114	47
Naval incidence	12	2	1		1		1		1	2	2	1	1
Naval Air Station, Alameda	2									1	1		
Naval Air Station, Moffett Field	2	1			1								
Other stations with only one case	8	1	1				1		1	1	1	1	1

TABLE 3. *Monthly incidence of poliomyelitis in selected continental and in adjacent cities, Navy and Marine Corps Stations, 1952*—Continued

Area	Month (1952)												
	Total	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Memphis, Tenn.													
Civilian incidence	74			1	1		4	15	12	21	10	8	2
Naval incidence	13							1	12				
Naval Air Station, Memphis	4								4				
Naval Air Technical Training Center, Memphis	9							1	8				

TABLE 4. *Acute anterior poliomyelitis, paralytic and nonparalytic, according to type of personnel*

(Specific incidence and incidence rates per 1,000 average strength, U. S. Navy and Marine Corps, 1952)

Type of personnel	Incidence	
	Number	Rate per 1,000 average strength
Total male officers	32	0.33
Line, USN	24	0.25
Line, USMC	6	0.35
Medical Corps	1	0.22
Warrant Officer, Hospital Corps	1	2.99
Total male enlisted	150	0.16
Medical and dental	8	0.27
All other naval	106	0.15
Marine Corps	36	0.17
Female enlisted (excluding medical and dental)	1	0.15
Total	183	0.17

SUMMARY AND CONCLUSIONS

A review of new cases of acute anterior poliomyelitis admitted during 1952 appears to indicate that specific prophylactic measures should be applied generally, without waiting for confirmed cases on a ship or station, if the incidence of paralytic cases is to be materially reduced. This deduction applies to medical and dental personnel as well as to other categories of Navy and Marine Corps personnel.

No justification could be discovered for requiring the passive immunization of contacts subsequent to the detection of single or multiple cases on a ship or station, or of medical department personnel following exposure to a patient with the disease.

From the experience in the period 1950-1952, within the limitations of the data reviewed, the inference seems plain that a marked reduction in incidence of acute anterior poliomyelitis awaits the development for general use of an actively immunizing material which can be administered prior to exposure, or of some other prophylactic measure not as yet proposed.

REFERENCES

1. Acute anterior poliomyelitis in Navy, 1950 and 1951. *U. S. Navy Medical News Letter* 22: 32-35, July 10, 1953.

2. Plan for allocation of gamma globulin: issued April 15, 1953, by the Office of Defense Mobilization in the Executive Office of the President. *Pub. Health Rep.* 68: 666-668, July 1953.

3. Distribution and use of gamma globulin: statement issued April 20, 1953, by Division of Medical Sciences of the National Research Council. *Pub. Health Rep.* 68: 660-665, July 1953.

4. Hammon, W. McD.; Coriell, L. L.; Wehrle, P. F.; and Stokes, J., Jr.: Evaluation of Red Cross gamma globulin as a prophylactic agent for poliomyelitis; final report of results based on clinical diagnosis. *J. A. M. A.* 151: 1272-1285, Apr. 11, 1953.

5. *Morbidity and Mortality Weekly Report,* Federal Security Agency, Public Health Service, Office of Vital Statistics, Vol. 1, No. 1, Jan. 11- No. 51, Dec. 1952.

6. Salk, J. E.: Studies in human subjects on active immunization against poliomyelitis; preliminary report of experiments in progress. *J. A. M. A.* 151: 1081-1098, Mar. 28, 1953.

7. Weaver, H. M.: Progress in research on poliomyelitis. *Pub. Health Rep.* 68: 669-677, July 1953.

8. Editorial: Immunization from paralytic poliomyelitis. *Ann. Int. Med.* 38: 1339-1344, June 1953.

Modern Preparation of Dental Cavities

The introduction of high speeds, diamond instruments of special design, and carbide burs into restorative procedures has provided a more efficient method for the rapid removal of hard tooth enamel. Through the application of carefully worked out technics and procedures, efficiency in cavity preparation may be increased while the time factor is reduced. A combination of high speeds, light pressures, and the continuous use of coolants greatly reduces trauma incident to operative procedures. These are important factors in relieving nervous tension for both the patient and the operator. In the final analysis, success in the clinical application of modern instruments and increased operating speeds is dependent on the operator's knowledge of the many physiological and mechanical principles involved and on his mastery of special technics and procedures which, to some degree, change the present concepts of procedures in cavity preparation.

—REX INGRAHAM, D. D. S., and
H. M. TANNER, D. D. S.
in *Journal of the American Dental Association,* p. 323, Sept. 1953

Air Force Surgeon General Receives Chilean Decoration

Ambassador Anibal Jara of Chile, left, and Major General Harry G. Armstrong, USAF (MC)

Major General Harry G. Armstrong, Surgeon General of the U. S. Air Force, recently received the *Medalla Militar de Segunda Clase de la Fuerza Aerea de Chile* from Ambassador Anibal Jara of Chile in a ceremony at the Chilean Embassy in Washington. The gold medal of the Chilean Air Force, which had not previously been given to a United States military medical officer, was awarded to General Armstrong for his "valuable services to the Chilean Air Force and to all humanity" as the author of *Principles and Practice of Aviation Medicine,* and for his assistance in providing training to Chilean students at the U. S. Air Force School of Aviation Medicine.

The ceremony was witnessed by Major General Raul Yazigi, Surgeon General of the Chilean Air Force, and Brigadier General Jorge A. Castro, Surgeon General of the Chilean Army, who were attending a medical meeting in Washington.

AIR EMBOLISM AS A RESULT OF SUBMARINE ESCAPE TRAINING

JACK L. KINSEY, *Commander, MC, USN*

AIR embolism has been the most frequent casualty experienced at the submarine escape training tank at this naval base. The air enters the pulmonary circulation through alveolar capillaries ruptured by overdistention of the lungs caused by excessive intrapulmonary air pressure.[1] Decompression illness (caisson disease, bends, or staggers)[2] differs in that rapid reduction of ambient pressure liberates nitrogen from solution so that bubbles form in both tissues and blood. Such bubbles, if intravascular, occasionally produce symptoms similar to air embolism, but the term, "air embolism," is by agreement reserved for movement in the vascular system of bubbles of air or gas introduced via veins or arteries.

It has been noted that the air embolism casualties occurring at the escape training tank (figs. 1 and 2) have rather definite patterns. The cases reported below illustrate three types that differ in speed of onset, severity, and localization of symptoms, and presumably in other but relatively obscure ways.

CASE REPORTS

Case 1. This man was undergoing advanced training in submarine escape, known as "free escape training," as well as in the use of the aqua lung. In free escape training the man enters the water from locks at varying depths, or swims down with an aqua lung, "ditches it," and allows himself to float to the surface, exhaling the expanding air from within his lungs at a uniform rate which is determined by his degree of buoyancy. He must breathe out or exhale enough air to vent off the increasing pressure within his lungs, but at the same time must not vent off so much air that he becomes "negatively buoyant" and sinks in the water. In such a training exercise as this, an instructor who is highly trained in this technic of escape accompanies the man in his ascent to check on him at all times and control his rate of exhalation through a series of signals such as tapping on the chest or on the lips.

From U. S. Naval Medical Research Laboratory, U. S. Naval Submarine Base, New London, Conn.

The man complained about fullness in his neck, "sore throat on the outside" which was noticed a few minutes after completing a

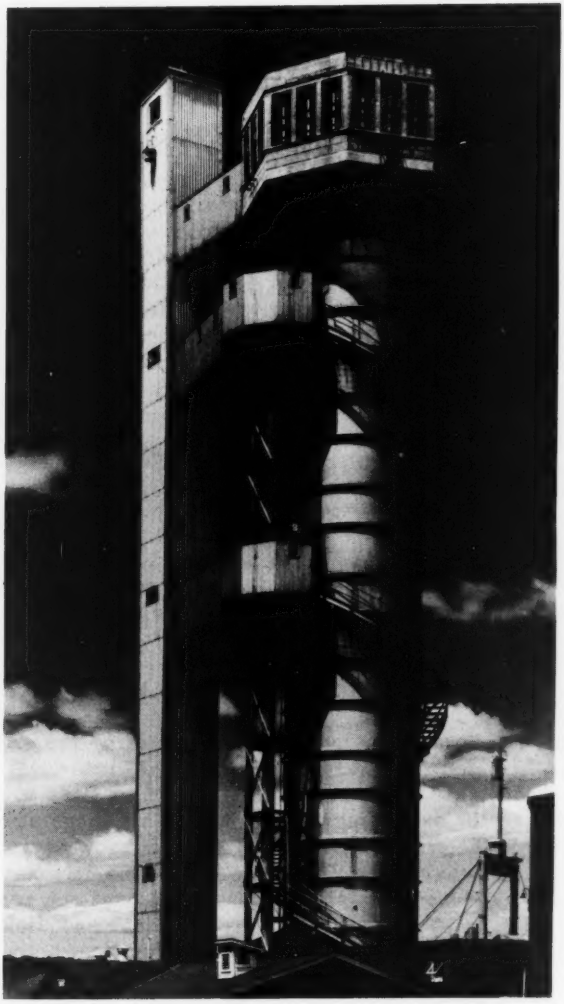


Figure 1. Submarine escape training tank, U. S. Naval Submarine Base, New London, Conn.

50-foot free ascent from the 50-foot lock to the surface. Prior to this, the man had descended to 100 feet with an aqua lung and "ditched" the lung and attempted to make a free ascent. He stated

that he did not have enough air to get to the surface and was taken into the 50-foot lock. The instructor accompanying him said that he ascended about 10 feet without expelling air. The instruc-

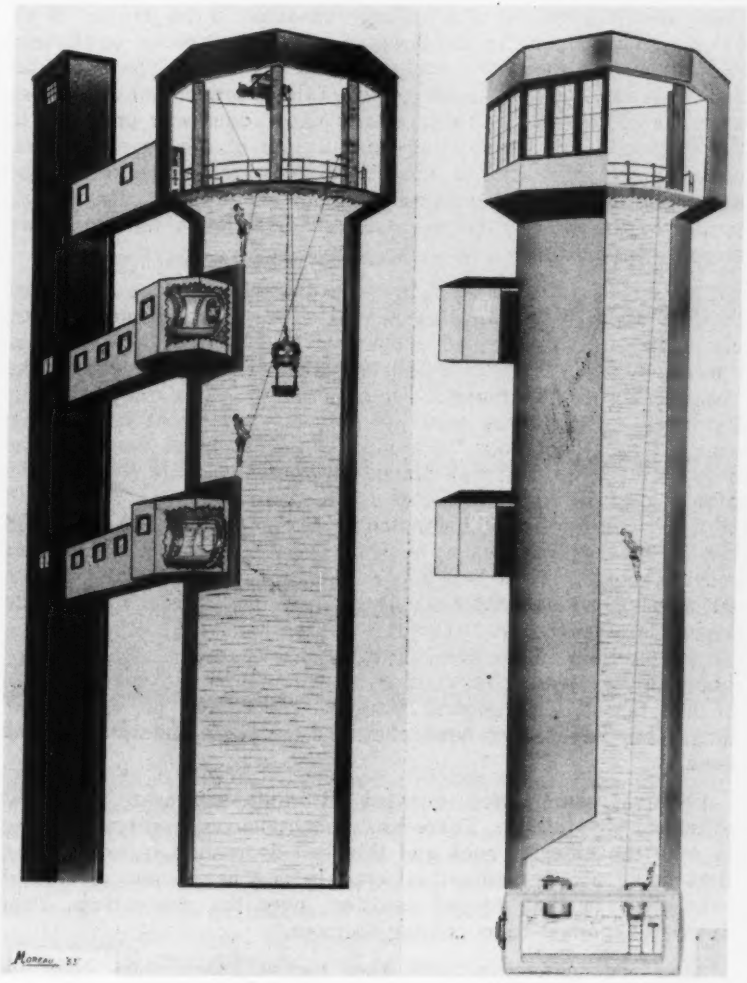


Figure 2. Cutaway illustration of the submarine escape training tank.

tor signaled him, by tapping his chest, to breathe out, which he did. He then tarted up again without expelling air and the instructor again signaled him and he responded with a "burp" of air. After a third time, the man signaled he was out of air and was

taken into the 50-foot lock. The free ascent from 50 feet to the surface was uneventful. While dressing, somewhat later, his voice began to change to a noticeably nasal quality. Because this increased, he reported to the medical officer.

He also complained of a pulling sensation in the midline of the chest and a fullness in the throat. Some subcutaneous emphysema was present in the supraclavicular area and neck. The voice had a brassy, flat quality. Loud musical rales were present anteriorly near the midline of the chest. A crackling sound was present with the second heart sound along the midline of the chest. He was taken to the infirmary via ambulance and anteroposterior and left and right lateral roentgenograms of the chest taken. He was returned to the escape training tank via ambulance for recompression.

The man was recompressed. At a depth of 35 feet the subcutaneous emphysema had disappeared. Subjective symptoms in the chest and throat remained unchanged at 100 feet. At this depth the rales and heart "crackle" had disappeared. He was further compressed to 165 feet, at which point definite subjective improvement in the chest pain was present. The throat fullness had changed to a "soreness." Physical examination of the chest was negative. The patient was placed on treatment table No. 3, which consists of 30 to 120 minutes at the equivalent air pressure of 165 feet; followed by 12 minutes at each depth of 140, 120, 100, and 80 feet; 30 minutes at each depth of 60, 50, and 40 feet employing oxygen or air breathing; 12 hours at 30 feet; and 2 hours each at 20 and 10 feet. The only finding at this time was unequal pupils. At the 30-foot stop there was no change subjectively, but he complained of external anterior neck soreness, which was worse on swallowing or when he opened his mouth wide; dryness of his throat; and general fatigue. There was no chest pain, dizziness, nausea, or headache, and no paraesthesias or numbness.

Physical examination revealed all cranial nerves to be normal; reflexes, physiologic. There was subcutaneous crepitus bilaterally over the anterior neck and this had decreased in extent since first being noted; mediastinal crackle was heard only on forcible exhalation in the stooped position, over the precordium. There were no abnormal heart or lung findings.

After recompression there were minimal complaints upon surfacing, mainly slight soreness in the neck muscles. There was slight inequality of pupils, left larger than right; subcutaneous crepitus, right side of neck; no abnormal chest findings. He was transferred to the infirmary for further observation. Roentgenograms revealed presence of air in the planes of cleavage in both the mediastinum and cervical areas (fig. 3).

Figure 3 (case 1). Lateral roentgenogram showing mediastinal emphysema.

Case 2. This man was undergoing repeat training for the third occasion in the use of the submarine escape appliance, also known as the "Momsen lung." When he was making the 100-foot escape the instructor noted that he was not making a proper escape at about 22 feet from the surface. The appliance was fully distended and a large bubble of air escaped from his mouth. Although given the signal to "breathe deeper into the appliance" it remained fully distended and then he was allowed to ascend about three feet up the line. With the appliance distended and bubbles streaming from the flutter valve it was evident that the man was not breathing into the appliance.

The man was removed from the line into the 18-foot lock. He was examined by the duty tank medical officer in the lock. The patient stated that he was "dizzy, and left hand feels funny." He

stated that the appliance functioned well after it was charged with oxygen prior to leaving the 100-foot lock. However, after he started his ascent, he felt all right but stated that "it seemed as though I couldn't breathe into the appliance at all but I did let bubbles of air out of my mouth." He was taken to the surface in the roving bell which, as can be seen in the cutaway of the submarine escape training tank (fig. 2), allows a man to be surfaced from any depth from 80 feet upward with head and shoulders in an air pocket.

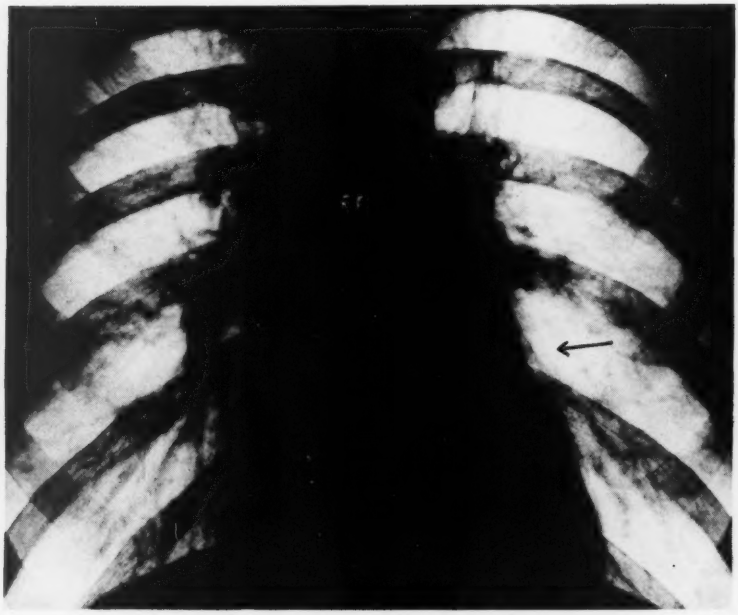


Figure 4 (case 2). Anteroposterior roentgenogram showing presence of air in the mediastinum.

Physical examination during the two-minute elevator trip to the ground level revealed that he was coherent and co-operative with complaint of "numbness all over my left forearm, losing my left grip." The left-hand grip was very weak as compared with his right. En route from the elevator to the recompression chamber his general condition underwent rapid deterioration. Although conscious, he stumbled, and in falling, cried, "My legs feel weak."

He was given immediate recompression. At 60 feet he noted that strength was returning in his left hand and that the numbness was decreasing. At 80 feet most of the numbness had subsided. At 165 feet he felt "fine." The general physical and neurologic examination was negative at this depth.

This man was also treated on table No. 3. For the first 24 hours following treatment a definite crackling sound was heard on auscultation alongside the lower sternum during complete expiration. The heart beat accentuated this crackle.

Roentgenograms of the chest showed air in the mediastinum (figs. 4 and 5). The physical and roentgenographic findings of mediastinal emphysema had disappeared by the third day and the patient was discharged to duty.

Figure 5 (case 2). Roentgenogram, lateral position, showing mediastinal emphysema.

Case 3. This man left the 50-foot lock and appeared to be in no difficulty. Bubbles were seen issuing from his mouth. When he reached the 20-foot level he was being accompanied by an instructor so the view glass (a transparent-bottomed, plastic box through which one of the officers observes the training procedure) was switched to view the next man as he left the 50-foot lock.

When next observed, this patient was thrashing around in the water on the surface, apparently in a convulsion. At this time a considerable quantity of frothy, red fluid issued from his mouth

285934 O—54——7

He was carried to the elevator and on the way down he gave two or three convulsive gasps. Artificial respiration was attempted during this time, but his chest was rigid. At no time was he conscious, nor did he make any purposeful movements. No radial, temporal or carotid pulse was obtainable. There was very minimal cyanosis. He was removed from the elevator and carried to the recompression chamber in the research annex of the tank buildings. Pressure was started and about one minute later his muscles relaxed for the first time, his eyeballs rolled upward, and his pupils became fixed. No pulse was obtainable at this time and cyanosis remained minimal. Artificial respiration was continued, with a good exchange of air, as the pressure in the chamber was built up. The radial and temporal pulses were checked at intervals, but no pulse beat could be detected.

Pressure in the chamber was built up to 73.4 lb. per square inch (equivalent to 165 feet of water). At this time 1 cc. of epinephrine solution, 1:1000, was injected into the left median basilic vein. A minute later a similar dose was injected directly into the apex of the heart.

Artificial respiration and the administration of oxygen by mask were continued for about 11 minutes, when examination revealed no response to strong skin stimulus and no muscle movements of any kind. The eyeballs were rolled upward, the pupils dilated and fixed, and there was no response to strong light stimulus directed into the pupils. No respiratory or cardiac sounds could be detected by auscultation. At this time treatment was discontinued and the occupants of the chamber were decompressed according to the standard decompression table for 170 feet and 40 minutes.

It was the impression of the attending medical officer that he died shortly after being placed in the recompression chamber. The clinical impression was that the cause of death was acute air embolism, with cerebral anoxia and cardiac insufficiency, secondary to the introduction of considerable quantities of air into the pulmonary blood stream.

Following is a summary of the significant findings at autopsy: Upon removing dura mater, the pia mater was found to be clear and all of the underlying cortical blood vessels were seen to contain widely dispersed air bubbles. Some vessels contained so much air that nearly all of the blood was forced out, leaving a 2- to 3-cm. expanse of blood vessel free of blood. There was hardly a cortical vessel that did not contain at least a few air bubbles.

The visceral pleura was for the most part smooth, thin, and shiny; however, there were about 10 small areas of superficial "bleb formation." They were filled with air and were elevated about 1 or 1.5 mm. from the surface of the lung. These blebs were

found on all surfaces of the lungs with the exception of the apical region. The pericardial sac was obliterated by rather fine, dense adhesions between the pericardium and the epicardium. This obliteration seemed to be old and was complete.

There was marked dilation of the right auricle and atrium of the heart. The left auricle and atrium were also dilated moderately. The pericardial sac, as mentioned, was opened only with separation of the fine, threadlike adhesions. Upon opening the heart under water, air was found in the left atrium and ventricle. The blood was somewhat frothy in these chambers. The free margin of the mitral valve was thickened, with some rolling. The papillary muscles were markedly enlarged and hypertrophied. The coronary arteries were patent throughout their entire length and showed only minimal atherosclerosis. No entrapped air was discovered in the coronary arteries.

The external surfaces of the lungs were smooth and shiny and exhibited the previously mentioned superficial bleb formation. The cut surface was pinkish purple, with an accentuated crepitant sensation to passage of the knife blade. There were no visually apparent areas of atelectasis or emphysema; however, it seemed, from the marked expansion of the lungs while still in the chest, with overlapping in the midline and increased crepitation, that there was a generalized emphysema. A thin, frothy, pink fluid could be expressed in minimal amount from the cut surface. Numerous veins that were opened contained foamy blood, due to entrapped air bubbles.

Case 4. This man was undergoing advanced training in submarine escape. He previously had completed escapes with the submarine escape appliance from 18 feet, 50 feet, and 100 feet, respectively. Following that, he had made three successful free escapes from the 18-foot lock and was making a first escape from the 50-foot lock when the accident occurred. He made an apparently normal escape and bubbles were seen to be issuing from his mouth by his accompanying instructors. He reached the surface of the water and the first inkling that the instructors had of the accident was when the man reached for the ladder to climb from the water and fell back into the water. He was quickly removed from the water and found to be comatose and in a rigid tonic convulsion. During the time he was being removed from the training platform, placed in the elevator, and taken down to the lower level he breathed in a stertorous fashion but soon ceased to breathe entirely. No palpable pulse could be detected during this time. He was immediately placed in a recompression chamber and pressure was started. Artificial respiration was attempted and 1 cc. of 1:1000 epinephrine solution was injected into the cardiac area. At no time could a pulse be detected, nor were any voluntary

respiratory movements initiated. The duty doctor, who had accompanied the patient from the time he was removed from the water until he was pronounced dead, considered that the patient died either in the descent in the elevator or shortly after being placed in the recompression chamber. Pressure was stopped when that equivalent to a depth of 70 feet had been reached. All attempts at treatment were discontinued at that time.

At autopsy there was obvious crepitant subcutaneous emphysema extending along the neck on both sides from the sternal notch to the mastoid prominences on both sides. In the cranial cavity, the superficial cortical blood vessels contained large numbers of air bubbles, but were not obvicusly distended.

Examination of the organs of the thoracic cavity in situ revealed extensive, crepitant, mediastinal emphysema, involving primarily the fatty tissues of the mediastinum and extending up the neck as far as the incision was carried. The heart was very markedly dilated with air, actually being puffed out like a balloon. Palpation of the heart indicated that it contained little or no blood. The principal dilatation appeared to be that of the right auricle and ventricle, but both the right and left auricles and ventricles were dilated with air. The visceral pleura was smooth and glistening, and showed no adhesions, but exhibited several subpleural blebs of varying sizes. These ranged from about 0.5 to 3.0 cm. in diameter and were filled with air. All major vessels encountered were ligated before being severed, in order to prevent air from leaking out. Each ligated vessel was opened under water, and it was observed that bubbles of air, along with blood, issued from most of the large vessels opened. The largest amounts of air were expressed from the aorta and superior vena cava.

There was marked dilatation of both right and left auricles and atria of the heart. Both of the ventricles contained a large amount of air and a small amount of blood. This blood was dark red and was not frothy. Examination of the intraventricular septum revealed no obvious patency or rupture. The coronary arteries contained numerous bubbles of air, there being more air than blood in these vessels. There were no obvious areas of myocardial infarction.

Both lungs appeared to be uniformly crepitant and emphysematous. As noted above, superficial blebs were seen on the external surfaces of both lungs. Bubbles of air could be expressed from the pulmonary vessels, but these vessels did not appear to be distended with air. Repeated sectioning of the lungs and hilar areas failed to reveal any gross structural changes or evidences of rupture.

DISCUSSION

The clinical picture in case 1 was that of rather mild, local symptoms coming on relatively slowly. In case 2, the symptoms were moderately severe, came on rapidly, responded well to recompression therapy but showed residuals similar to case 1 (substernal pain, crackling, roentgenographic findings). Cases 3 and 4 presented extremely severe symptoms with death occurring prior to or shortly after entering the recompression chamber. The need for haste and the noise of the air entering the chamber during recompression preclude a careful, complete physical examination, as getting the casualties under pressure is of paramount importance.

It is the writer's belief that the severity of symptoms and the rapidity of onset is related to two main factors: (1) the amount of air entering the vessels or tissues, and (2) the tissues and pathways involved in the trauma. In further considering item (1), this is determined by the depth at which the injury occurred, the speed of ascent, and the amount of air expelled through the usual respiratory passage during the ascent. Item (2) presents a more complex situation, with little concrete information as to the pathways of the air in the interstitial tissues. In case 1, it can readily be deduced that an interstitial emphysema resulted from tearing of the alveoli and air entering the mediastinum by following the course of the large pulmonary blood vessels, then following the fascial planes into the neck. The relatively slow onset of symptoms may be due to resistance to the spread of air by the tissues encountered. This case does not represent true air embolism, as the symptoms are primarily due to air in the interstitial tissues, but it may represent an intermediate step in the development of true air embolism.

In case 2, it must be assumed that air was introduced into the vascular system in small amounts. This could occur by air entering small interstitial veins, being carried to the left ventricle and then producing arterial air emboli, the most serious of which would be in the coronary or cerebral vessels. The symptoms in case 2 indicate that the primary area affected was the right cerebral hemisphere anterior and posterior to the Rolandic fissure. It is theorized that the amount of air entering the vascular system is limited by the small diameter of the blood vessels involved; the remainder of the air follows the pathways noted in case 1. The more rapid transport of the air in the vascular system produces the cerebral symptoms quickly and this along with the greater severity masks those effects caused by air in fascial planes. The latter symptoms are noted in most instances after decompression has been completed.

It is apparent that in cases 3 and 4 vastly greater amounts of air gained entry to the vascular system and interstitial tissues. It can be seen from the gross autopsy reports that both men suffered acute pulmonary emphysema (bleb formation) as well as mediastinal and subcutaneous emphysema of marked degree. The most significant postmortem finding, in this author's opinion, and probably the chief cause of death in both cases was the dilatation of the cardiac chambers with air. It is believed that the "old rheumatic endocarditis" with valvular lesion was not a factor in case 3, as there were no signs of decompensation and no subjective symptomatology present before the accident. Air in the cerebral vessels was probably of secondary importance because, although the amount found would eventually cause serious neurologic complications or death, the victim either expired or was moribund from the anoxia resulting from the air trapped in the heart. The mode of entry of the air was not discovered in either of these patients; however, the presence in both of air in the left auricle and ventricle indicates that the path was through the pulmonary veins. In case 4 the distention with air of the right auricle and ventricle suggests an additional less direct path. It seems unlikely that the air would travel in retrograde fashion through the pulmonary arterial system, even if entry into these thicker-walled vessels were gained. Wolffe and Robertson[3] in 1935 indicated that air introduced intravenously did not go against the blood stream in spite of variation in gravity. A more plausible route would be through the pulmonary lymphatic vessels to the large veins of the neck and thence to the right heart. The pressure of air in the right heart presents a problem similar to that found in previously reported surgical cases. Martland[4] in 1945, discussing air embolism as a complication of surgery, points out that a relatively large volume of air reaching the right auricle results in a cardiac tampon of foamed blood.

In dealing with this situation, Durant and associates[5] suggested placing the patient in the left lateral position to displace the air trap in the right ventricle. Hamby and Terry[6] and Musgrove and MacQuigg[7] reported use of this maneuver in successfully treating cases of air embolism with air in the right side of the heart. If, however, air should be present in both chambers, the maneuver would probably be of doubtful value. In this instance the head should be placed at a lower level than the rest of the body to minimize the possibility of air entering the cerebral circulation. While it is, of course, mandatory that recompression be accomplished as rapidly as possible in cases of air embolism resulting from reduction of ambient pressure, it may be that placing the casualty in the left lateral position with head lowered while being transported to the recompression chamber and during the recompression procedure will prove to be a method whereby lives may be saved.

SUMMARY

Air embolism may result from accidental introduction of air into the vascular system during submarine escape training. In four patients reported, two of whom died, the speed of onset and severity of symptoms were of three different types. In treatment a simple maneuver has been suggested as a possible means of preventing death in cases where only the right heart is involved. Immediate recompression is essential in air embolism occurring in decompression.

REFERENCES

1. Polak, B., and Adams, H.: Traumatic air embolism in submarine escape training. *U. S. Nav. M. Bull.* 30: 165-177, Apr. 1932.
2. Thorne, I. J.: Caisson disease; study based on 300 cases observed at Queens-Midtown Tunnel project, 1938. *J. A. M. A.* 117: 585-588, Aug. 23, 1941.
3. Wolffe, J. B., and Robertson, H. F. Experimental air embolism. *Ann. Int. Med.* 9: 162-165, Aug. 1935.
4. Martland, H. S.: Air embolism, with special reference to its surgical importance. *Am. J. Surg.* 68: 281-286, June 1945.
5. Durant, T. M.; Long, J.; and Oppenheimer, M. J.: Pulmonary (venous) air embolism. *Am. Heart J.* 33: 269-281, Mar. 1947.
6. Hamby, W. B., and Terry, R. N.: Air embolism in operations done in sitting position; report of five fatal cases and one of rescue by simple maneuver. *Surg.* 31: 212-215, Feb. 1952.
7. Musgrove, J. E., and MacQuigg, R. E.: Successful treatment of air embolism. *J. A. M. A.* 150: 28, Sept. 6, 1952.

Transverse Abdominal Incisions

A recent survey of over 500 certified surgeons in this country revealed that only about 26 percent are employing transverse or muscle-splitting abdominal incisions for the common types of abdominal operations. It appears therefore that the majority of surgeons and most of the other physicians performing surgery are using midline or paramedian incisions. It seems inconceivable that adherence to these standard incisions by so many still exists, in view of the many unfavorable reports concerning the significantly high incidence of wound dehiscence and herniation which follows these incisions. These complications have been reported to occur in from 2 to 10 percent of abdominal operations in which the midline or paramedian vertical incisions were employed, whereas the reports of many surgeons using a muscle-splitting or transverse incision indicate that these two complications are rare, occurring in less than 1 percent of all cases.

—LOUIS T. PALUMBO, M. D., and
IRVING A. KATZ, M. D.
in *A. M. A. Archives of Surgery*, p. 514, Oct. 1953

ROENTGENOGRAPHICALLY DEMONSTRABLE APPENDICEAL CALCULI

PHILIP E. GEDEON, *Captain, MC, USA*

JOHN J. SCHWAB, *Captain, MC, USA*

FECALITHS may be found in as high as 67 percent of patients with appendicitis.[1] They are rarely diagnosed by roentgenographic examination for two reasons: (1) Preoperative roentgenograms of the abdomen of a patient with well-defined acute appendicitis are not usually taken, and (2) most fecaliths are not radiopaque. Felson and Bernhard[2] believed that any patient having an appendiceal calculus will probably develop acute appendicitis, and they emphasized the importance of early demonstration of such calculus in any patient presenting a diagnostic problem. When a calculus is found, it should be treated as a surgical emergency because perforation of the appendix occurs in from 37 to 59 percent of such patients.[2,3]

Radiopaque appendiceal calculi have been reported to contain calcium magnesium phosphates and carbonates with cellular debris and bacteria.[1,3] Ingestion of mercury has also been shown to produce demonstrable calculi in the appendix causing appendicitis.[4]

This is a report of a patient with acute appendicitis due to roentgenographically demonstrable calculi of bismuth.

CASE REPORT

A 30-year-old woman was admitted to the hospital 2 January 1953 complaining of intermittent pain in the abdomen and vomiting for three days. The pain was colicky and generalized but more pronounced in the right lower abdominal quadrant. She had had no bowel movements for three days prior to the onset of the present illness. She had been treated by one of us for acute diarrhea with bismuth and paregoric three weeks previously in the outpatient clinic.

From U. S. Army Hospital, 8168th Army Unit, APO 503, San Francisco, Calif.

Figure 1. Anteroposterior roentgenogram of the abdomen showing fecaliths coated with radiopaque substance.

The physical findings were: temperature, 99.6° F.; pulse, 84; and slight distension of the abdomen with diffuse tenderness, more marked in the right lower quadrant. The white blood cell count was 13,250 with 73 polymorphonucleocytes. A roentgenogram of the abdomen showed radiopaque fecaliths in the right lower quadrant (fig. 1). An acutely inflamed appendix containing

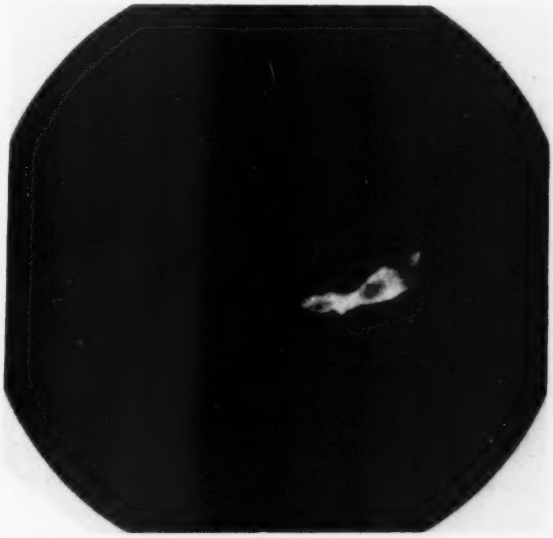


Figure 2. Specimen after appendectomy. Chemical analysis proved opaque material to be bismuth.

three concretions was removed. A roentgenographic study of the removed appendix verified the preoperative diagnosis of appendiceal calculi (fig. 2). The pathologic diagnosis was acute appendicitis with fecaliths. Because the patient had received bismuth preoperatively, a chemical analysis of the appendiceal concretions was made which revealed a large quantity of bismuth. The postoperative course was uneventful and the patient was discharged from the hospital 13 January 1953.

REFERENCES

1. Banks, R. W.: In Bockus, H. L.: *Gastro-Enterology;* Volume 2, The Small and Large Intestine and Peritoneum. W. B. Saunders Co., Philadelphia, Pa., 1949. p. 867.

2. Felson, B., and Bernhard, C. M.: Roentgenologic diagnosis of appendiceal calculi. *Radiology* 49: 178-191, Aug. 1947. Quoted by Airth, G. R.: Appendiceal calculus. *Brit. J. Radiol.* 21: 526-527, Oct. 1948.

3. Childe, A. E.: Calcified appendiceal fecal concretions in childhood; report of 8 cases. *Am. J. Roentgenol.* 58: 455-463, Oct. 1947.

4. Birnbaum, W.: Inflammation of vermiform appendix by metallic mercury. *Am. J. Surg.* 74: 494-496, Oct. 1947.

Principles of Surgical Training

It must be freely admitted that few hospitals are so fortunately situated as to be able to satisfy our highest ideals for surgical training. It must also be admitted that without dedication to the correct principles a successful program cannot be achieved. We must, therefore, make our first tenet acceptance by the hospital staff and administration of the principle that the training program is to be geared to the trainee and that service to the staff and the hospital is secondary. This philosophy must be accepted if exploitation of residents is to be avoided. Not that training and service are incompatible; quite contrariwise they are actually complementary. The resident who is receiving an excellent training becomes a loyal and conscientious member of the team, while his contemporary whose days are so filled with retractor holding, record making, and routine care that he has no time to think is a doubtful asset to any institution. Furthermore, unless the principle is embraced by all who have a part in the program, conflicts are inevitable.

—DONALD M. GLOVER
in *Surgery Gynecology and Obstetrics,*
p. 519, Oct. 1953

PHENYLBUTAZONE TOXICITY

Report of Two Cases

IRVIN M. BECKER, *Lieutenant, junior grade, MC, USNR*

MARTIN C. SHEA, *Lieutenant, junior grade, MC, USNR*

SINCE the introduction of phenylbutazone (butazolidin) into this country by Kuzell and others,[1] numerous reports of the toxic features of the drug have appeared in the literature. Most significant of these have been agranulocytosis,[2-5] with death in two cases;[6,7] activation of peptic ulcer disease;[1] hemorrhage from peptic ulcer;[8-10] precipitation of peptic ulcer;[9,11] and perforation of peptic ulcer.[10] Additional features mentioned have included rash, edema, nausea, vomiting, vertigo, anemia, diarrhea, dyspnea, epistaxis, stomatitis, thrombocytopenia, hematuria, liver dysfunction, chills, and fever.[1,5,9,12,13]

We have recently had the opportunity to follow two patients who developed complications while being treated with phenylbutazone.

CASE REPORTS

Case 1. This 56-year-old man was admitted to the hospital on 25 May 1953 with the chief complaint of malaise of one week's duration. One week prior to the onset of symptoms the patient was placed on 600 mg. of phenylbutazone daily by his family physician for generalized degenerative joint disease. After one week of this therapy, during which time the arthritic symptoms disappeared, the patient developed a severe chill followed by symptoms of generalized weakness, abdominal cramps, headaches, and anorexia. Severe chills occurred twice daily, usually in the morning and evening, lasting about 30 minutes, and followed by fever and perspiration, with temperature elevation to about 103° F. For three days prior to admission the patient had dark, reddish brown stools with occasional streaks of bright red blood. His appetite had been poor and there was a weight loss of 14 pounds during the week preceding admission. He complained of generalized soreness and cramping in both lower abdominal quadrants and in the right upper quadrant. No change in bowel function was noted.

From U. S. Naval Hospital, Oakland, Calif.

There were also symptoms of slight frontal headaches with dizziness. He experienced mild, fainting-like episodes two to three times daily, associated with numbness in the fingers, arms, and legs, following ingestion of the drug. In association with the chills and fever, the patient observed some cardiac palpitations with occasional skipping of beats and progressive exertional dyspnea. A slight cough with small amount of sputum and soreness across the anterior chest were also noted.

The patient had had a gastric resection in July 1952 for a benign gastric ulcer of the lesser curvature which had failed to heal under medical management. His only complaint at that time was mild epigastric distress of short duration.

He was well developed, fairly well nourished, but appeared to be in acute distress. Temperature was 103.2° F.; pulse, 100; respirations, 18; and blood pressure, 110/64. The skin was pale, dry, hot, and inelastic. The fundi showed grade I retinopathy. A few moist rales were heard at the left lung base posteriorly and in the left axilla. The heart was normal except for an occasional premature contraction. The abdomen was soft. There was a scar in the midline above the umbilicus from the previous gastric surgery. There was tenderness in the left lower, right lower, and right upper abdominal quadrants. The bowel was palpable in the right and left lower quadrants and appeared to be spastic. There was generalized resistance in the right upper quadrant; no definite liver edge was palpated. The tendon reflexes were equal but slightly hyperactive. On rectal examination, reddish brown stool was obtained which was 4 plus for occult blood with Gregerson mixture.

Laboratory findings on admission were a leukocyte count of 18,000 with 15 percent nonsegmented neutrophils, 68 percent segmented neutrophils, 15 percent lymphocytes, 2 percent monocytes; erythrocyte count, 4,120,000; hemoglobin, 11.5 grams; platelets, 180,000; sedimentation rate (Wintrobe method), 35 mm.; hematocrit, 39 VPC; thymol turbidity, 9.7 units; alkaline phosphatase, 11.5 Bodansky units; blood urea nitrogen, 17.3 mg. per 100 cc.; fasting blood glucose, 125 mg. per 100 cc.; prothrombin time, 14 seconds or 100 percent; total proteins, 5.9 grams per 100 cc. with albumin, 2.3 grams, and globulin, 3.6 grams; and serum bilirubin, 0.88 mg. per 100 cc. The sulfobromophthalein retention on 27 May was 22 percent at 45 minutes with a dosage of 5 mg. per kg. of body weight; occult blood in stool, 4 plus; blood smear, negative for malarial parasites; urine analysis (catheterized specimen) and culture, negative; stool for ova, parasites, and culture, negative; sputum culture, *Diplococcus pneumoniae;* culture of throat smear, positive for beta hemolytic micrococcus, but the species was undetermined. A routine

roentgenogram of the chest on admission was negative. Gastric analysis revealed 27 units of free acid with a total of 40 units at the end of 45 minutes.

On admission the patient was placed on a strict ulcer-type program and supportive parenteral fluids. The generalized abdominal cramping, with tenderness to palpation in the left lower quadrant, persisted. Stools returned to normal color on the second day. The temperature curve revealed elevations as high as 103.6° F. occurring irregularly once or twice daily (fig. 1). Blood cultures were taken with each elevation and were found to be positive for nonhemolytic, coagulase-negative for *Micrococcus pyogenes,* variety undetermined, on four occasions. The difficulty with which this organism was grown and the fact that it was isolated from four separate cultures make it appear significant

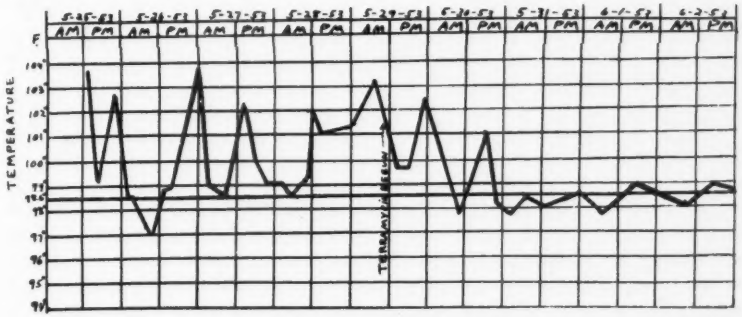


Figure 1 (case 1). Temperature curve showing effect of treatment with oxytetracycline (terramycin).

rather than a contaminant. Febrile agglutinations for typhoid, paratyphoid, *Proteus* OX19, and brucella, taken on 27 May, were negative. Viral studies consisting of complement fixation for Q fever, psittacosis-lymphogranuloma venereum group, influenza (A and B), and cold hemagglutinins, taken on 29 May, were negative. On this date, after five days without clinical change, the patient was started on 750 mg. of oxytetracycline (terramycin), given orally every six hours for four doses and then 500 mg. every six hours. Within 24 hours after the oxytetracycline was begun, the temperature began to fall with elevations to 101° and 102° F. until 31 May, when it returned to normal and remained there (fig. 1). The patient continued to have generalized abdominal cramps and discomfort for several days after his temperature became normal, and then became asymptomatic. On 8 June, febrile agglutinations and viral studies were again negative, and tuberculin, coccidioidin, and histoplasmin skin tests were also negative.

On 10 June a barium enema revealed numerous diverticula in the ascending and descending colon, and upper gastrointestinal series showed a normal functioning Billroth I type of gastric resection with no evidence of marginal ulceration. By 16 June all laboratory studies had returned to normal and the patient was discharged asymptomatic except for mild arthritic complaints.

Comments. Following one week of phenylbutazone therapy, this patient was admitted with symptoms of gastrointestinal involvement, bacteremia, and transient liver damage. It is believed that the clinical findings presented by this patient were directly related to phenylbutazone.

Case 2. This 39-year-old man was admitted to the hospital on 17 April 1953 with the chief complaint of colicky pain in the right side of the back, of three months' duration. The attacks came at intervals of about every four weeks. Two days prior to admission the patient noted that his abdomen was distended and he had an episode of vomiting. One hour later there was an onset of knifelike pain in the right flank and extending down the right anterior abdomen. With this he observed bleeding on urination, but the next morning the bleeding had subsided.

In 1949 a diagnosis of rheumatoid spondylitis involving the spine and hips had been made. The patient also gave a history of gassy, crampy pains with much belching and flatus of three years' duration. He stated that the discomfort was always worse while he was on aspirin therapy for the arthritis. According to the patient, a roentgenogram of the gastrointestinal tract, taken six months prior to admission at this hospital, was negative. In January 1953, the patient was placed on phenylbutazone therapy for rheumatoid spondylitis. He took 200 mg. four times a day for about two weeks. Then he took 600 mg. daily. This dose was gradually decreased until two weeks prior to admission to the hospital, during which time only 200 mg. daily were taken. The last tablet was taken the night before admission. From the beginning of therapy the patient stated that his abdominal complaints became more marked and he developed definite epigastric pain which occurred about three to four times daily. Associated with this abdominal pain was a high, posterior back pain. The patient had occasional night pain but had noted no bleeding.

At the time of admission the temperature, pulse, respiration, and blood pressure were normal. The patient was well developed, somewhat undernourished, and appeared to be in acute distress. The outstanding positive findings were markedly diminished motion of the entire back and tenderness to deep palpation over the right flank and the epigastrium.

Complete blood cell count, sedimentation rate, urinalysis, blood serology, and roentgenograms of the chest were normal. The blood urea nitrogen was slightly elevated to 25 mg. per 100 cc. An intravenous pyelogram revealed a filling defect of the upper pole of the right kidney with distortion of the calyces apparently caused by a medially placed mass. Roentgenograms of the spine showed evidence of rheumatoid spondylitis. A nephrectomy was performed on 23 April and a large mass was found at the upper pole of the right kidney. The pathologic report was that of multiple cysts of the right kidney and renal adenoma, probably clear cell carcinoma.

The patient's postoperative course was completely uneventful until the twelfth postoperative day when he suddenly vomited "coffee-ground" material and two hours later had a grossly tarry stool. He was given 1,500 cc. of blood during the next 12 hours and the bleeding subsided. The following morning he developed a distended abdomen and a flat roentgenogram revealed a markedly dilated stomach. He was placed on Wangensteen suction. His fluids were carefully followed, and daily chemistries were within normal limits. On 2 May the Levine tube was clamped for four hours and only a small amount of residual material was obtained. At this time he was transferred to the medical service and the Levine tube was removed. He was placed on skimmed milk, 5 ounces every hour on the hour, and 1 ounce every hour on the half hour. He was aspirated twice daily, at 0700 and 2200, for gastric retention. The patient's aspirations revealed approximately 250 to 300 cc. retention in the mornings and as much as 1,000 cc. retention in the evenings. A review of the bleeding factors at this time revealed normal bleeding time, clotting time, prothrombin time, and platelets. The sulfobromophthalein retention was 13 percent at 45 minutes with a dosage of 5 mg. per kg. of body weight. The stools were negative for occult blood. Electrolytes were followed every few days. Roentgenograms of the upper gastrointestinal tract on 13 May revealed a rather marked gastric distention with delayed emptying. In addition, the roentgenograms showed a constant collection of barium measuring 8 mm. in diameter in the region of the pyloroduodenal segment (fig. 2). The bulb itself was markedly deformed and spastic. A roentgenogram taken 90 minutes after the barium meal showed approximately 50 percent retention of the barium. Because the patient showed persistent obstruction on a strict ulcer type of program, a subtotal gastric resection was performed on 28 May. The stomach was moderately enlarged and the area of the pyloric sphincter and proximal centimeter of duodenum was indurated and scarred. The pathologic specimen showed the ulcer to be located at the junction of the gastric and duodenal mucous membranes.

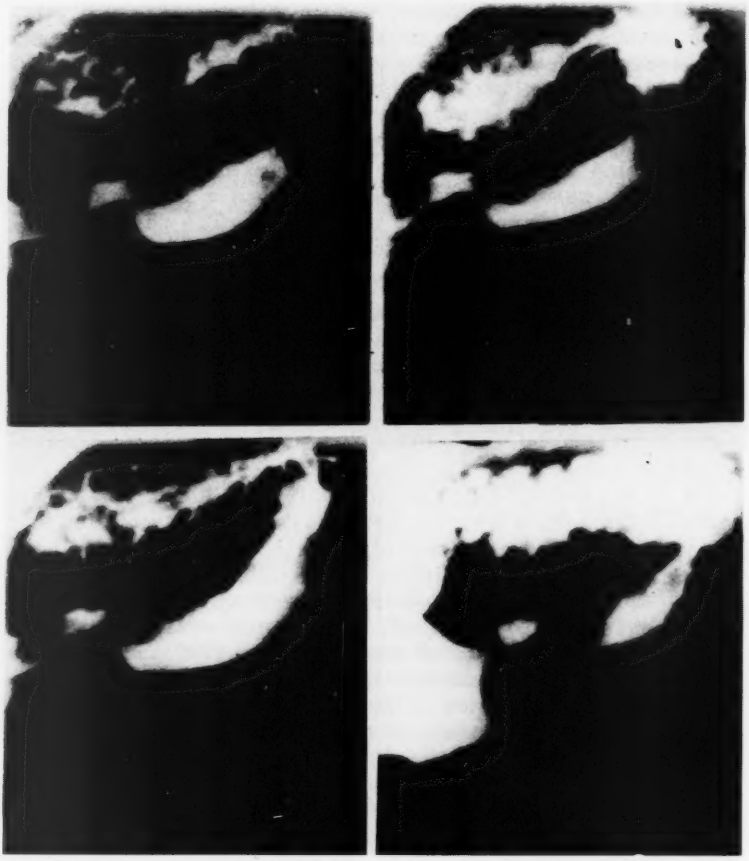


Figure 2 (case 2). Four spot roentgenograms of large pyloroduodenal ulcer.

Comments. This patient had epigastric distress of three years' duration with a negative gastrointestinal series 6 months prior to admission to the hospital. There was a definite change in the character of his symptoms from the beginning of phenylbutazone therapy, and a definite ulcer type of rhythm was established. It seems apparent that the patient had an ulcer at the time of his admission to the hospital but the clinical features were overlooked in view of his presenting complaint of flank pain and hematuria.

SUMMARY

Two patients at this hospital developed complications while being treated with phenylbutazone. In case 1, the bizarre clinical

picture characterized by the unusual temperature curve is of general interest. Case 2 is believed to be the first of obstruction of a peptic ulcer related to phenylbutazone therapy.

REFERENCES

1. Kuzell, W. C.; Schaffarzick, R. W.; Brown, B.; and Mankle, E. A.: Phenylbutazone (butazolidin) in rheumatoid arthritis and gout. *J. A. M. A.* 149: 729-734, June 21, 1952.

2. Kuzell, W. C., and Schaffarzick, R. W.: Phenylbutazone (butazolidin). *Bull. Rheumat. Dis.* 3: 23-24, Nov. 1952.

3. Bershof, E., and Oxman, A. C.: Agranulocytosis following use of phenylbutazone (butazolidin). *J. A. M. A.* 151: 557-558, Feb. 14, 1953.

4. Kiely, J. M., and Stickney, J. M.: Agranulocytosis caused by phenylbutazone and 4-amino-antipyrine. *Proc. Staff Meet., Mayo Clin.* 28: 341-345, June 17, 1953.

5. Stifel, J. L., and Burnheimer, J. C.: Agranulocytosis following administration of phenylbutazone (butazolidin). *J. A. M. A.* 151: 555-556, Feb. 14, 1953.

6. Steinberg, C. L.; Bohrod, M. G.; and Roodenburg, A. L.: Agranulocytosis following phenylbutazone (butazolidin) therapy. *J. A. M. A.* 152: 33-36, May 2, 1953.

7. Etess, A. D., and Jacobson, A. S.: Fatality due to agranulocytosis following use of phenylbutazone (butazolidin). *J. A. M. A.* 151: 639-640, Feb. 21, 1953.

8. Krainin, P.: Gastric ulcer with massive hemorrhage following use of phenylbutazone; report of case. *J. A. M. A.* 152: 31-32, May 2, 1953.

9. Stephens, C. A. L., Jr.; Yeoman, E. E.; Holbrook, W. P.; Hill, D. F.; and Goodin, W. L.: Benefits and toxicity of phenylbutazone (butazolidin) in rheumatoid arthritis. *J. A. M. A.* 150: 1084-1086, Nov. 15, 1952.

10. Shields, W. E.; Adamson, N. E., Jr.; and MacGregor, J. B.: Peptic ulcer perforation following administration of phenylbutazone. *J. A. M. A.* 152: 28-30, May 2, 1953.

11. Raffensperger, E. C.: Multiple gastric ulcers occurring during phenylbutazone therapy. *J. A. M. A.* 152: 30-31, May 2, 1953.

12. Charet, R., and Siegel, I.: Unusual reaction following use of phenylbutazone (butazolidin); report of case. *J. A. M. A.* 151: 556-557, Feb. 14, 1953.

13. Steinbrocker, O.; Berkowitz, S.; Ehrlich, M.; Elkind, M.; and Carp, S.: Phenylbutazone therapy of arthritis and other painful musculoskeletal disorders. *J. A. M. A.* 150: 1087-1091, Nov. 15, 1952.

Music and Anesthesia

The salutary effect of music on the emotionally disturbed is not so surprising as its synergistic action in anesthesia. There are several reports claiming that the use of music has sharply reduced the need for preinduction medication. When the administration of music is continued into the stage of anesthesia, it has been possible to secure satisfactory narcosis in dental patients with much lower concentrations of nitrous oxide. Although it is justifiable to suspend final judgment on these enthusiastic reports until we can obtain further confirmation, continued experimentation should be encouraged. Certainly the dangers are almost nil. Side reactions and toxic effects are said to be rare, except for some mild nausea produced by Ravel's Bolero.

—MAURICE H. FRIEDMAN, M. D.
in *Medical Annals of the District of Columbia*, p. 423, Aug. 1953

285934 O—54——8

CYSTIC ADULT TERATOMA OF THE TESTIS ASSOCIATED WITH FAILURE OF THE UROGENITAL UNION

ANTHONY A. BORSKI, *Captain, MC, USA*
JAMES C. KIMBROUGH, *Colonel, MC, USA (Ret.)*

THE occurrence of benign testicular tumors is rare. Lewis[1] found only six relatively benign teratomas in a series of 250 malignant tumors of the testis. Cook and Kimbrough[2] reported 80 tumors of the testis of which only three were benign. They also noted two cases of epidermoid cyst and one of adult teratoma. Prior to their series, only five epidermoid cysts of the testis were reported.

Epidermoid, or inclusion cysts, contain ectodermal elements without evidence of endoderm or mesoderm. Adult teratoma may show unidermal tissue only or they may contain tissues developed from all three germ layers. Overgrowth of one element may be prominent. Adult teratoma is a relatively benign lesion but metastases do occur. All testicular tumors should be considered malignant until proved otherwise. The treatment of choice in all malignant tumors of the testes is early radical surgery, including an orchiectomy and resection of preaortic lymph nodes to be followed by appropriate radiation therapy.[3]

Michelson[4] reported 74 patients with congenital anomalies resulting from urogenital union failure. There were 29 with absence of the vas deferens. No reference could be found to testicular tumor associated with the absence of the ductus deferens.

CASE REPORT

A 24-year-old man was admitted to this hospital on 25 July 1953. During examination of the genitalia because of sterility, a small nodule was felt in the superior pole of the right testicle. The epididymis was very firm and slightly enlarged in the region of the globus major. The patient had not been aware of any changes in the testis. All laboratory and radiologic studies were within

From Walter Reed Army Hospital, Washington, D. C.

normal limits. Exploration of the testicles, using the inguinal approach, showed a normal-sized organ with a hard nodule at the superior pole. The globus major was cystic with markedly dilated epididymal tubules. The tunica albuginea was incised and a white, firm, smooth, round, 1.5-cm. nodule was shelled out of the surrounding normal testicular tissue. On section, the tumor was found to contain a laminated yellow-tan material which was separated easily from the white fibrous capsule. There was a small cyst with a yellowish spot on the inner surface which was attached to one side of the capsule. Exploration of the cord failed to reveal the vas deferens. The microscopic section contained stratified squamous epithelium and also ciliated columnar epithelium. A biopsy of the testis showed active spermatogenesis, and some tubules contained sperm. On section of the epididymis, the cystic mass was found to contain clear fluid and the tubules were markedly dilated. The pathologic diagnosis was cystic adult teratoma of the testis and a cyst of the epididymis.

REFERENCES

1. Lewis, L. G.: Testis tumors. In Andrus, W. D. (editor-in-chief): *Advances in Surgery,* Volume II. Interscience Publisher, Inc., New York, N. Y., 1949. pp. 419-494.

2. Cook, F. E. Jr., and Kimbrough, J. C.: Epidermoid cysts of testicle. To be published.

3. Kimbrough, J. C., and Borski, A. A.: Treatment of tumors of testes. *South. M. J.* 46: 486-491, May 1953.

4. Michelson, L.: Congenital anomalies of ductus deferens and epididymis. *J. Urol.* 61: 384-390, Feb. 1949.

Irradiation With Radioactive Particles

The interstitial use of radioactive particles seems to me much more rational than attempting to destroy a tumor mass by direct infiltration. If the lymphatic spread of the tumor is massive, of course, neither method can be effective, since uniform distribution cannot be achieved. But if the nodes are not packed with tumor, interstitially injected particles will be carried to them and can destroy the fresh tumor cells. The patient with testis tumor without palpable nodal metastasis seems the ideal candidate for this form of irradiation, either as a preparation or as a substitute for radical node dissection. The approach is still experimental because of the possibilities of causing damage to normal tissues (such as the ureters and rectum), but it promises to be clinically useful.

—FRANK HINMAN, Jr., M. D.
in *A. M. A. Archives of Surgery,* p. 130, Aug. 1953

TORSION OF A PAROVARIAN CYST COMPLICATING PREGNANCY

Report of a Case

HAROLD PESCOVITZ, *Captain, USAF (MC)*

THOMAS A. NOONE, *Captain, USAF (MC)*

TORSION of an ovarian cyst during pregnancy occurs three times as often as in the nonpregnant state. This brief report is presented because this serious complication of pregnancy can be prevented if an existing ovarian cyst is discovered early and surgically removed during the second trimester of gestation.[1,2]

CASE REPORT

A 20-year-old white primigravida was admitted to this hospital on 1 June 1953 complaining of sharp pains in her right lower abdominal quadrant and radiating into the groin. Her expected date of confinement was 24 June 1953. Two hours before admission she vomited. Urgency was noted but no frequency or dysuria. Past history and functional inquiry were negative.

Physical examination revealed that the fetal heart was normal. There was tenderness in the right lower abdominal quadrant without spasm, rigidity, or rebound. No flank tenderness was noted. Peristalsis was normal. Rectal examination revealed an undilated cervix without any cul-de-sac tenderness. The leukocyte count was 10,600 with 71 percent polymorphonucleocytes, and catheterized urine was negative. She was placed on bed rest and observed.

The blood cell count and a urinalysis were repeated seven hours later. The urine again was negative and the leukocyte count was 9,250 with 79 percent polymorphonucleocytes. Abdominal examination findings remained stationary. Conservative therapy was continued. Forty-eight hours after admission there was an increase in the pain and tenderness with the pain now present to the right of the umbilicus and in the entire right iliac

From U. S. Air Force Hospital, Pepperrell Air Force Base, Newfoundland.

fossa. The leukocyte count was 12,300 with 91 percent neutrophils. The urine remained negative. A roentgenogram of the abdomen showed an intrauterine fetus in a vertex presentation. In view of the persistence and increase in abdominal findings along with leukocytosis, surgical intervention was believed indicated. The preoperative diagnosis was acute appendicitis, but a twisted right ovary or tube was also considered. The patient was taken to surgery 56 hours after admission. Under spinal anesthesia, through a small right pararectus incision, a gangrenous right parovarian cyst, which had undergone torsion, was removed. The cyst had twisted on its pedicle two and a half turns in a counter-clockwise direction. The appendix was normal and was not removed. She was ambulatory the following day.

Three days after surgery she delivered a normal male child weighing six pounds after a seven-hour labor. The patient's postpartum and postoperative course were uneventful. She was discharged on 12 June 1953; the ninth postoperative day and the sixth postpartum day. The pathology report was "parovarian cyst, right, with hemorrhage in the wall."

DISCUSSION

In the near-term patient with a complication requiring an operation, the presence of the pregnancy should not be a limiting factor to surgical intervention. With the use of spinal anesthesia, there is little chance of the anesthetic agent having a deleterious effect on the fetus. Labor, postoperatively, may or may not occur. In its event, the proximity to term will produce a viable newborn. Cesarean section is not recommended. No elective surgery, *e. g.*, appendectomy, should be done which would prolong the procedure.

An ovarian cyst discovered during pregnancy should be removed during the second trimester in order to preclude complications of the cyst.[1,3,4] Postoperative hormonal therapy should be used. Falk and Bunkin[1] state: "The discovery of medium or large cysts during the early part of the third trimester calls for temporizing. The fetus is not yet viable, and operation always carries the risk of premature labor and strain on the abdominal wound. Hence, oophorectomy is unwarranted unless an emergency exists."

The differential diagnosis of a twisted ovarian cyst will include acute appendicitis and pyelitis. A flat roentgenogram of the abdomen should be done in all cases to demonstrate calculi (urinary, gallbladder, appendiceal), dermoid cysts, et cetera. Serial white blood cell counts are of much diagnostic value. Exploration is warranted when the diagnosis of a "surgical abdomen" is made.

REFERENCES

1. Falk, H. C., and Bunkin, I. A.: Management of ovarian tumors complicating pregnancy. *Am. J. Obst. & Gynec.* 54: 82-87, July 1947.
2. Eastman, N. J.: *Williams Obstetrics.* 10th edition. Appleton-Century-Crofts, Inc., New York, N. Y., 1950. p. 894.
3. Davis, C. H.: Pelvic tumors complicating pregnancy. *Am. J. Obst. & Gynec.* 59: 1202-1207, June 1950.
4. Philpott, N. W.: Surgical emergencies in gynecology and obstetrics. *Surg. Gynec. & Obst.* 90: 557-560, May 1950.

Naval Inspector General Visits Dental Facilities in Far East

Rear Admiral Ralph W. Malone, DC, USN, Inspector General of Naval Dentistry, is shown talking with a patient in the clinic of the U. S. Naval Hospital, in Yokosuka, Japan, while on a recent inspection of Navy and Marine Corps dental facilities in the Far East. The smiling Japanese dental technician is Fumiyo Abe. After leaving Japan, Admiral Malone visited dental clinics in the Philippines, Guam, and Kwajalein before returning to Washington.

FAMILIAL PERIODIC PARALYSIS

MORTON H. RACHELSON, *First Lieutenant, USAF (MC)*

PERIODIC paralysis is characterized by recurrent flaccid muscular paralysis, usually of the lower extremities; familial history of the disease; loss of the deep tendon reflexes and electrical excitability of the muscles during the attack; low serum potassium during the paresis; normal sensorium and absence of sensory loss; and response to treatment with potassium salts. Although most writers credit Cavaré[1] with describing the first case, Talbott[2] includes, in his excellent review in 1941, an unrevised report by Musgrave,[3] published in 1727. Talbott stated there are references in the literature to more than 400 cases.

Potassium was used as the treatment empirically as early as 1901 by Singer and Goodbody[4] and Buzzard.[5] It was first in 1934 that Biemond and Daniels[6] noted a low serum potassium during the paralytic attack, but not until 1937 was the paralysis attributed to the low serum potassium by Aitken and his colleagues.[7] In 1948, Gass and associates[8] attempted to explain the pathologic physiology of the lowered serum potassium on the basis of hepatic glycogenesis, secondary to a stimulus from excessive carbohydrate metabolism, and thereby removing available serum potassium. McQuarrie and Ziegler[9] called attention to influence of different foods in the diet in preventing the attacks.

Sporadic cases of periodic paralysis occur, and Herrington[10] believed about 80 percent of them to be hereditary. Shinosaki[11] called attention to the association of thyroid disease in 62 percent of his cases.

Although periodic paralysis is more common in males in a ratio of 2:1 to 3:1, and usually makes its onset in the first two decades of life, it is rarely seen in military personnel. Reports of this disease occurring in the armed services have been described by Holmes,[12] Van Der Schaar,[13] Johnson,[14] and by Watson.[15] Weissman[16] recently described a case of nonfamilial periodic paralysis associated with thyrotoxicosis in a young veteran.

From U. S. Air Force Hospital, Westover Air Force Base, Mass.

CASE REPORT

A 20-year-old white soldier was admitted to this hospital, while on leave, on 30 May 1953 with paralysis of both lower extremities and weakness of his arms of about six hours' duration. When the patient was 16½ years old, he found on awaking one morning that he was unable to move his arms and legs, and this condition had lasted two days. During that time he was able to control his sphincters, but he had no bowel movements. He had not experienced any peculiar sensations or loss of sensation. Since that time he has had one or two similar episodes every two months. He was inducted into the Army four months before admission and had had only one episode before the present illness. It had occurred two months previous to admission while he was on leave. He did not seek medical attention at that time. When the patient awoke on the morning of admission, he was unable to move his legs and noted weakness in his arms. He had no difficulty swallowing and denied shortness of breath, but he complained of backache and a feeling of nausea.

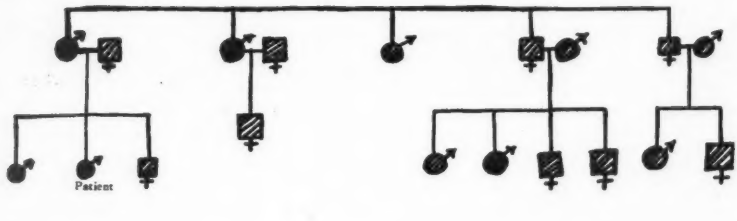


Figure 1. Genealogic tree of family with periodic paralysis.

Several members of the patient's family (fig. 1) have experienced similar intermittent episodes of paralysis involving all four extremities. A year ago, his brother was discharged from the Army with the diagnosis of periodic paroxysmal paralysis, which had been present since the age of 17 years, and has been taking potassium chloride daily. His father, now deceased. had similar attacks of paralysis while he was young. An uncle had episodes of paralysis while he was in the Navy but not at present. A cousin has similar attacks. Information regarding the patient's paternal grandparents is not available but there is no paralysis in his mother's family. There is no family history of thyroid disease.

On physical examination, the patient appeared to be well developed, well nourished, alert, and not acutely ill. There was no evidence of head trauma; the neck was supple; the trachea was

in the midline; and the respirations were not noisy. The thyroid was not palpable. The pupils were round, regular, equal, and reacted to light. The extraocular movements were normal. Examination of the ears, nose, and mouth revealed no abnormalities. The pharynx was clear with a good gag reflex. The chest moved symmetrically. There was flaccid paralysis of both lower with a paresis of both upper extremities. There was no sensory loss or paresthesias. There was complete loss of the deep tendon reflexes and of plantar response. Abdominal and cremasteric reflexes were normal. There was no spasm of the neck, back, or extremities.

Laboratory findings were a leukocyte count of 10,000 with 76 percent neutrophils, 18 percent lymphocytes, and 6 percent eosinophils; hemoglobin, 16 grams; hematocrit, VPC 45 per 100 ml.; urinalysis, normal; spinal fluid, clear with no cells and protein of 11.6 mg. per 100 ml. A roentgenogram of the chest showed no significant abnormality.

The day following admission, the patient was afebrile, and had full control of all his extremities with normal strength. During his first week in the hospital attempts to gain laboratory confirmation of periodic paralysis were undertaken. Serum studies for electrolytes showed all values to be within normal limits.

On 10 June 1953, he again was unable to move his arms and legs when he awoke. When examined several hours later, no muscle movements or resistance and no fibrillary twitching were discernible Tendon jerks were poorly elicited on reinforcement, and were much weaker than previously described when the patient was free of his paralysis. An electrocardiogram was made and electrical muscle stimulation was attempted but by the time these two tests were completed, the paralysis was practically absent, and normal results were obtained throughout. During that attack, serum sodium and potassium levels were 148 mEq./L and 2.6 mEq./L, respectively. During the next two days, an attempt was made to study the patient's urinary excretion of potassium and sodium. Because of the inability to control the dietary intake of these electrolytes, not much significance can be attached to the nearly normal values achieved. The urine excretion was 207 mEq./L and the potassium was 82 mEq./L for the total 24-hour urine output (1,090 cc.). Intravenous dextrose tolerance, sodium, and potassium tests were done on 16 June. Because only 50 cc. of 50 percent dextrose was given intravenously, an inadequate result was obtained and no significant change in serum potassium or sodium levels was demonstrated.

On 17 June, 0.5 cc. of 1:1000 epinephrine was given subcutaneously, revealing potassium levels of the serum starting at 3.6 mEq./L and falling to 2.8 mEq./L. No loss of reflexes or paralysis was demonstrated although the electrocardiogram

showed flattening of the T waves. During the rest periods between tests, the patient felt well and was ambulatory about the ward, with no complaints.

On 27 June, he was permitted to go home on a week-end pass. Following a strenuous day's swimming he went to bed feeling well but slightly tired. The next morning he was unable to move his muscles and he was brought to the hospital, completely areflexic and with his arms and legs paralyzed. The serum potassium and sodium levels at the time were 1.7 mEq./L and 147 mEq./L, respectively. Electrical muscle testing at the time showed no response to faradic current and very weak response to galvanic current. One subsequent attempt was made to reproduce an attack of paralysis, following recovery from this episode, by giving both dextrose and insulin. This attempt also was unsuccessful for, as in the previous attempts to reproduce the paralysis, our anxiety to avoid serious hypokalemia with attendant respiratory paralysis and cardiac arrhythmia led to the administration of too small a dose of both dextrose and insulin. Liver function studies and the basal metabolism were normal. Despite our inability to reproduce the paralysis, we believe that we have demonstrated a family history of the disease, manifested by recurrent paralysis with areflexia, loss of electrical excitability, and low serum potassium levels, with complete recovery. The patient has been maintained on a dose of 3 grams of potassium chloride daily, without any further attacks.

DISCUSSION

Potassium is the chief intracellular cation in the body, the largest concentration being in the muscles. It is taken up in the formation of glycogen and is necessary in the formation of phosphorylated carbohydrates. Although periodic paralysis has been attributed to a low serum potassium level, little is actually known about the metabolic fate of this mineral. Balance studies show that the potassium is not excreted in the urine and feces and that the intake is normal. The spinal fluid potassium is normal, and there are no significant changes in serum sodium levels. Although it has been postulated that the potassium is held in the liver as glycogen, liver function, thyroid, and adrenal function studies have been normal.

There are several inciting factors which may bring on an attack of paralysis. Excessive carbohydrate metabolism, caused by ingestion of large amounts of sugar, is often the most common factor. Others are: trauma, disease, exposure to cold and dampness, excessive physical exertion, emotional excitement, coitus, menstruation, and constipation. Prodromal symptoms may precede the attack and usually include a feeling of warmth and heaviness

of the extremities, aching in the legs, irritability, apprehension, fatigue, and sweating.

The paralysis may be partial or complete, localized or generalized. It may involve the upper or lower extremities and may be unilateral. It usually begins peripherally and progresses centrally, and is most pronounced in the legs. The extensor muscles are more affected than the flexors, and the muscles of respiration and deglutition may be involved with serious consequence. A transient anuria may occur, but this is due to a lessened desire to void rather than to paralysis of the muscles. Recovery is usually in the reverse order.

Induced attacks may be produced by giving:[17, 18]

1. Glucose in large amounts (usually 200 to 250 grams).

2. Epinephrine in doses of 1 cc. of a 1:1000 aqueous solution at hourly intervals. (It usually takes 5 cc. to produce an attack. We had given only 0.5 cc. and therefore failed.)

3. Ephedrine in doses of 0.1 gram orally every hour until the attack is produced.

4. Adrenal cortex extract.

5. ACTH and cortisone, which are more dangerous because of their prolonged effects.

6. Insulin, with and without glucose.

7. Large amounts of water orally, to cause loss of potassium by diuresis, which is a poor method.

Treatment is aimed at the prevention of attacks. The patient should avoid strenuous exercise, emotional excitement, and exposure to cold and dampness. Carbohydrate intake should never be more than 100 grams at one meal, an effort should be made to lower the fat and carbohydrate and increase the protein intake, and completely eliminate candy, preserves, and pastries. Prophylactic doses of from two to 10 grams of potassium chloride are given daily.

REFERENCES

1. Cavaré: Observation d'une paralysie général du sentiment et du mouvement affectant le type intermittent. *Gaz. méd. de Toulouse* 38: 1853.

2. Talbott, J. H.: Periodic paralysis; clinical syndrome. *Medicine* 20: 85-143, Feb. 1941.

3. Musgrave, W.: Periodical palsy. *The Phil. Trans. & Coll.* to the end of the year 1700, London. 3: 33, 1727.

4. Singer, H., and Goodbody, F. W.: Case of familial periodic paralysis with a critical digest of literature. *Brain* 24: 257-285, 1901.

5. Buzzard, E.: Three cases of family periodic paralysis with consideration of pathology of disease. *Lancet* 2: 1564-1567, Dec. 7, 1901.

6. Biemond, A., and Daniels, A. P.: Familial periodic paralysis and its transition into spinal muscular atrophy. *Brain* 57: 91-108, June 1934.

7. Aitken, R. S.; Allott, E. N.; Castleden, L. I. M.; and Walker, M.: Observations on case of familial periodic paralysis. *Clin. Sc.* 3: 47-57, July 1937.

8. Gass, H.; Cherkasky, M.; and Savitsky, N.: Potassium and periodic paralysis; metabolic study and physiological considerations. *Medicine* 27: 105-137, Feb. 1948.

9. McQuarrie, I., and Ziegler, M.: Hereditary periodic paralysis; effects of fasting and various types of diet on occurrence of paralytic attacks. *Metabolism* 1: 129-144, Mar. 1952.

10. Herrington, M. S.: Successful treatment of 2 cases of familial periodic paralysis with potassium citrate. *J. A. M. A.* 108: 1339, Apr. 17, 1937.

11. Shinosaki, T.: Klinische Studien über die periodische Extremitätenlahmung. *Ztschr. f. d. ges. Neurol. u. Psychiat.* 100: 564-611, 1926.

12. Holmes, J. M.: Familial periodic paralysis. *Brit. M. J.* 1: 80-82, Jan. 18, 1941.

13. van der Schaar, P. J.: Een geval van paroxysmale verlamming (familiare periodieke verlamming). *Geneesk. tijdschr. v. Nederl.-Indië* 81: 2241-2254, Oct. 21, 1941.

14. Johnson, J. W., Jr.: Familial periodic paralysis; report on father and son in World Wars I and II. *War Med.* 8: 382-385, Nov.-Dec. 1945.

15. Watson, C. W.: Familial periodic paralysis; report of case showing no changes in serum potassium level with description of electroencephalographic findings. *Yale J. Biol. & Med.* 19: 127-135, Oct. 1946.

16. Weissman, L.: Periodic paralysis associated with thyrotoxicosis; case report. *J. Clin. Endocrinol.* 12: 1223-1228, Sept. 1952.

17. Allott, E. N., and McArdle, B.: Further observations on familial periodic paralysis. *Clin. Sc.* 3: 229-239, Apr. 1938.

18. Pudenz, R. H.; McIntosh, J. F.; and McEachern, D.: Role of potassium in familial periodic paralysis. *J. A. M. A.* 111: 2253-2258, Dec. 17, 1938.

Gastric Ulcer and Gastric Cancer

Gastric ulcer is a surgical disease, and not a disease that may be medically treated for an arbitrary period of six weeks or longer before surgery. It is well recognized that 10 to 15 percent of gastric ulcers, seemingly benign, are actually malignant. For the diagnosis of gastric cancer, the roentgenologic examination is but one tool, and should be complemented by gastric analysis, endoscopic examination, gastric washings, and Papanicolaou staining. In the absence of demonstrated pathology, continued unexplained gastrointestinal distress should be treated by laparotomy. This can be of more value and is more conservative therapy than repeat roentgenologic and endoscopic examinations.

—LEONARD E. MEISELAS, M. D.

in *American Journal of the Medical Sciences*, p. 385, Oct. 1953

Protect the individuality of the patient, and the Art of Medicine will retain its most essential quality—the personal relationship between physician and patient.

—ROBERT W. KELLEY, M. D.

in *Mississippi Valley Medical Journal*, p. 134, Sept. 1953

Aero Medical Association Observes Silver Jubilee 29-31 March 1954

The chief air force medical officers of six foreign nations are among the many specialists in aviation medicine who will participate in the twenty-fifth anniversary meeting of the Aero Medical Association at the Statler Hotel in Washington, D. C., 29-31 March 1954, under the presidency of Rear Admiral Bertram Groesbeck, Jr., MC, USN (Ret.). Included among the scientific presentations are discussions of the aeromedical aspects of jet transport aircraft, crew safety and effectiveness aboard the new B-52 strategic bomber, noise and vibration problems, and the adaption of cinefluorographic and cineradiographic equipment to the human centrifuge.

Speakers from other countries on the silver anniversary program of the Association include Sir Harold E. Whittingham, former Director General of Medical Services, Royal Air Force; Air Vice Marshal Edward A. Daley, Director General of Medical Services, Royal Australian Air Force; Air Vice Marshal Chua Punsoni, Surgeon General, Royal Thai Air Force; Colonel Gustaf Severin, Surgeon General, Royal Swedish Air Force; Colonel Helge Smith, Surgeon General, Royal Danish Air Force; Colonel Tommaso Lo Monaco, Director of the Center of Studies and Research of Aviation Medicine, Italian Air Force; and Major Klaus Wiesinger, Chief Medical Officer, Swiss Air Force. Lieutenant General Gennaro Pera, Surgeon General of the Italian Air Force, will also attend the meeting.

Officers and civilian scientists of the Navy and Air Force included on the three-day program are:

29 March

Concepts of Aviation Medicine—Capt. Ashton Graybiel, MC, USN, Director of Research, U. S. Naval School of Aviation Medicine, Pensacola, Fla.

Failure of Aeronautical Performance as the Presenting Symptom of Disease—Lt. Col. Hamilton B. Webb, USAF (MC), Office of the Surgeon General, Department of the Air Force.

The Measurement of Personality Variables by Degree-Relevance—Lt. Comdr William F. Madden, MSC, USN, Assistant Director of Research, U. S. Naval School of Aviation Medicine, Pensacola, Fla.

Studies in the Evaluation of the Personality Characteristics of Successful Naval Aviators—Lt. (jg) Richard Stanley Melton, MSC, USNR, U. S. Naval School of Aviation Medicine, Pensacola, Fla.

In-Flight Feeding During Sustained Flight of Single-Place Jet Aircraft—Col. Albert W. VanSickle, USAF (MC), Turner Air Force Base, Ga., and 1st Lt. Richard J. Hogan, USAF, U. S. Air Force Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio.

The Pathologic Effects of Epicyclic Acceleration—Lt. (jg) Martin Lipkin, MC, USNR, Aviation Medical Acceleration Laboratory, Johnsville, Pa., and Herbert L. Ratcliffe, Sc. D., University of Pennsylvania School of Medicine, Philadelphia, Pa.

Linear Acceleration as a Survivable Hazard in Aviation—Edwin Hendler, U. S. Naval Aero-Medical Equipment Laboratory, Philadelphia, Pa.

Adaptation of Cinefluorographic and Cineradiographic Equipment to the Human Centrifuge—Lt. Charles H. Fugitt, MSC, USNR, U. S. Naval Aviation Medical Acceleration Laboratory, Johnsville, Pa.

Physiological Assessment of Positioning From Seated at 15° to Supine Under Varying Accelerative Stress—Capt. Charles F. Gell, MC, USN, Director, U. S. Naval Aviation Medical Acceleration Laboratory, Johnsville, Pa.

30 March

Development of a Personality Test Battery for Psychiatric Screening of Flying Personnel—Saul B. Sells, Ph. D., U. S. Air Force School of Aviation Medicine, Randolph Air Force Base, Tex.

Stress Factors Affecting Combat Pilots in Korea—Capt. Blair W. Sparks, USAF (MSC), U. S. Air Force School of Aviation Medicine, Randolph Air Force Base, Tex.

Understanding the "Fear of Flying Syndrome"—Col. Lucio E. Gatto, USAF (MC), Consultant in Psychiatry, Far East Air Forces, Tokyo, Japan.

Status of Ventilated Garments for High Speed Aircraft—H. A. Mauch, Chief, Environment Section, U. S. Air Force Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio.

Requirements for Crew Effectiveness in the B-52 Strategic Bomber—Col. Don Flickinger, USAF (MC), Assistant Deputy Chief of Staff for Development, Headquarters Air Research and Development Command, Baltimore, Md.

Analysis of Crew Capabilities During Test Flights in the B-52—Lt. Col. Guy Townsend, USAF, Test Pilot, Boeing Airplane Company, Seattle, Wash.

31 March

Limiting Factors in Protecting the Ear From Noise—Henning E. von Gierke, Dr. Ing., Assistant Chief, Bio-Acoustics Section and 2d Lt. Darrell R. Warren, USAF, U. S. Air Force Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio.

Noise and Vibration Control in the Air Force—Maj. Horace O. Parrack, USAF, Chief, Bio-Acoustics Section, U. S. Air Force Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio.

Jet Engine and Other Noise Problems Aboard Aircraft Carriers—Comdr. Ralph Lawrence Christy, Jr., MC, USN, Senior Medical Officer, U. S. S. *Franklin D. Roosevelt.*

Helicopter Evacuation of Battle Casualties in Korea—Capt. Warren E. Klein, MC, USN, U. S. Naval Air Station, Jacksonville, Fla.

Aircraft Accidents and Near-Accidents—Capt. Richard B. Phillips, MC, USN, and Lt. Comdr. Robert B. Giblin, USN, U. S. Naval Air Station, Glenview, Ill.

Aircraft Periscopes for Pilotage—Lt. Col. George O. Emerson, USAF (MC), Chief, Vision Section, U. S. Air Force Aero Medical Laboratory, Wright-Patterson Air Force Base, Ohio.

The Role of the Proprioceptive Senses in the Performance of Instrument Flight—Comdr. Norman L. Barr, MC, USN, Head, Aviation Medicine Division, Naval Medical Research Institute, Bethesda, Md.

Splenic Infarcts Associated With Hypoxia—Lt. Col. James P. Jernigan, USAF (MC), Capt. Charles E. Engel, USAF (MC), and Capt. Wesley L. Peterson, USAF, (MC), Francis E. Warren Air Force Base, Wyo.

Anti-malarial Drugs in Flying Personnel—Col. William R. Haas, USAF (MC), Consultant in Internal Medicine, Office of the Surgeon General, Department of the Air Force.

Some Aeromedical Aspects of All-Weather Flight—Comdr. Sidney I. Brody, MC, USN, Medical Liaison Officer, Bureau of Aeronautics, Department of the Navy.

Medical Teaching and Research

The main problem in medical education everywhere is to bring about a more general appreciation of the value of teaching. Teaching is not just a bagful of technical tricks, nor is it a tiresome waste of time. It is, or it ought to be, the reverse of a coin whose obverse is research. It is true that nowadays nearly every teacher is also a research worker, but is it the research that gets the pay and the glamour. This breeds the idea that going into the anatomy dissecting room or the physiology lecture theatre is an unwarrantable interruption of important work. Until people realize that to stimulate others to find things out is as useful as to find things out oneself, and that the two jobs should go together and not in separate compartments, the teaching of basic science will remain a profession in which deficiencies will have to be patched up and mistakes made good.

—D. C. SINCLAIR, M. D.
in *Lancet*, p. 467, Sept. 5, 1953

Deaths

GARCIA, Charles Todd, Major, USAF (MC), Bolling Air Force Base, Washington, D. C.; graduated from Ohio State University College of Medicine in 1936; ordered to active duty 15 May 1949; died 18 December 1953, age 47, in an automobile accident near Milford, Del.

GRAVELINE, Ernest Louis, Jr., Captain, MC, USAR, 23d Infantry Regiment, Second Division, Korea; graduated from University of Nebraska College of Medicine in 1949; certified by the National Board of Medical Examiners; ordered to active duty 24 June 1949; died 15 October 1951, age 29, in a communist prison camp in Korea.

HAYDU, Joseph Frank, Jr., Captain, DC, USAR, Camp Drake Replacement Depot, Japan; graduated from University of Louisville School of Dentistry in 1944; ordered to active duty 7 September 1944; died 29 October 1953, age 36, at his home in Sapporo, Japan.

HUTTO, James Foy, Lieutenant, DC, USN, Naval Air Station, Jacksonville, Fla.; graduated from Harvard University Dental School in 1949; ordered to active duty 29 June 1949; died 26 December 1953, age 30, of gunshot wounds accidently sustained while hunting near Mobile, Ala.

MARVIN, Theodore Richard, Lieutenant, MC, USNR, Marine Air Group Eleven, Japan; graduated from Ohio State University College of Medicine in 1943; ordered to active duty 7 January 1953; died 30 December 1953, age 37, from injuries incurred in an automobile accident near Atsugi, Japan.

SLOGOFF, Israel, Lieutenant Colonel, DC, USAR, 97th General Hospital, Frankfurt, Germany; graduated from Temple University School of Dentistry in 1933; ordered to active duty 30 July 1953; died 18 November 1953, age 41, of acute myocardial infarction, at the 97th General Hospital.

TINSLEY, Hubert Earl, First Lieutenant, USAFR (MSC), 301st Medical Group, Barksdale Air Force Base, La.; ordered to active duty 12 June 1951;died 18 December 1953, age 32, of acute subarachnoid hemorrhage.

Ophthalmology had its beginnings as a specialty under Queen Elizabeth. In 1561 the College of Physicians granted a faculty to John Luke to treat diseases of the eye, but he was strictly limited to the use of external means. Dr. Baily's tract, *A briefe Treatise concerning the Preservation of the Eyesight,* was first published in 1586 and went through seven editions. Richard Banister, "Mr. in Chyrurgery, Oculist and Practitioner in Physic," whom A. Sorsby terms "the first authentic voice in British ophthalmology," qualified in 1602, but did not publish his *Breviary of the Eyes* until 1622.

—Sir ARTHUR S. MacNALTY,
in *British Medical Journal,* p. 1183, May 30, 1953

Official Decorations

SILVER STAR

John F. Currin, *Lt. (jg), MC, USNR*
William C. Davis, *Lt. (jg), MC, USNR*
Leo T. Delaney, Jr., *Lt. (jg), MC, USNR*
Philip G. Dennen, *Lt. (jg), MC, USNR*

LEGION OF MERIT

Lawrence E. Bach, *Capt., MC, USN*
William W. Cox, *Lt. Col., MC, USA*
Harry E. Gunn, *Lt. Col., USAF (MSC)*
Bill J. Harris, *Comdr., DC, USN*
Kenneth B. Johnson, *Lt. Col., MC, USA*
Irvine H. Marshall, *Lt. Col., MC, USA*
Robert J. Platt, *Col., USAF (MC)*
Barnhard R. Reinertsen, *Capt., MC, USNR*
Clifford A. Stevenson, *Comdr., MC, USN*
Max H. Watkins, *Col., MC, USA*

SOLDIER'S MEDAL

Norman G. Miller, *2d Lt., MSC, USA*

BRONZE STAR MEDAL

Preston L. Adams, *First Lt., MSC, USA*
Arthur C. Anderson, *First Lt., MSC, USA*
Robert E. Baldwin, *Capt., MC, USA*
George C. Beattie, *Lt. Comdr., MC, USN*
Robert B. Benthack, *First Lt., MC, USA*
Clifford A. Best, *Col., MC, USA*
Russell H. Blood, *Capt., MC, USN*
Domenico Caporale, *First Lt., MSC, USA*
John C. Carden, *First Lt., MSC, USA*
Paul E. Clemens, *Lt. Col., MSC, USA*
Wendell H. Dickerson, *Lt. Col., MSC, USA*
Ivar E. Dolph, *Lt. Col., MC, USA*
Robert O. Ellingson, *First Lt., MSC, USA*
David Fisher, *Lt. Col., MC, USA*
James F. Fitzgerald, *Capt., MC, USA*
Frank A. Folk, *Lt., MC, USNR*
George M. Fries, Jr., *First Lt., MSC, USA*
Donald A. Fusia, Jr., *Capt., MC, USA*
Raul Garcia, *First Lt., MC, USA*
Robert M. Gillett, *Capt., MC, USN*
Malcolm J. Goos, *2d Lt., MSC, USA*
Dell M. Gray, *Major, MC, USA*
James D. Harvey, *Capt., MC, USA*
Dock T. Hatcher, *First Lt., MC, USA*
Clarence Jackson, *First Lt., MSC, USA*
Thirl E. Jarrett, *Comdr., MC, USN*
Robert B. Johnson, *Comdr., MC, USN*
James R. Karr, *Col., MC, USA*
Jack J. Kelly, *Lt. Comdr., DC, USN*
Arthur S. Kidwell, *Maj., MSC, USA*
Robert A. Knox, *First Lt., MC, USA*
Clayton B. Krewson, *Maj., DC, USA*
Robert J. Lavin, *Capt., MC, USA*
Harland W. Layer, *Col., MSC, USA*
Irvin B. Levin, *Capt., DC, USA*
Victor A. Machcinski, *First Lt., MC, USA*
Leopoldo E. Margarida, *First Lt., MSC, USA*
Harry E. Mason, *First Lt., MC, USA*
James A. McLaughlin, *Lt. Comdr., MC, USN*
Jack P. Mercer, *Capt., MC, USA*
Earl W. Mitchell, *Maj., MSC, USA*
Dryden P. Morse, *First Lt., MC, USA*
Robert E. Murto, *Lt., MC, USNR*
Robert E. Nelson, *Capt., MSC, USA*
Edward T. O'Dell, *Capt., MC, USA*
Louis T. O'Desky, *Capt., MC, USA*
John F. Otto, Jr., *First Lt., MC, USA*
Howard G. Parker, *Capt., MC, USA*

The names of officers of the medical services who have been awarded decorations by the United States Army, Navy, or Air Force since the beginning of the Korean campaign will be published following receipt of this information from official sources.
—*Editor*

285934 O—54——9

BRONZE STAR MEDAL—Continued

Robert L. Rea, *First Lt., MSC, USA*
Cecil D. Riggs, *Capt., MC, USN*
Francis A. Roach, *Lt., MC, USNR*
Donald H. Robinson, *Maj., MC, USA*
Frederick Rosenberg, *First Lt., MC, USA*
Neal D. Sanborn, *Lt. (jg), MC, USN*
Joseph Santo, *Maj., MSC, USA*
David W. Silverman, *2d Lt., MSC, USA*
Walter C. Southcott, *First Lt., MC, USA*
John F. St Mary, *Lt. MC, USNR*
Clifton Swafford, *First Lt., MC, USA*
Elbridge W. Telford, *Lt. Col., MC, USA*
Clyde C. Thompson, Jr., *First Lt., DC, USA*
Weldon G. Thyberg, *First Lt., MC, USA*
Basil Vetas, *First Lt., MSC, USA*
Leroy F. Von Lackum, *Lt. (jg), MC, USNR*
Harvey H. Waldo, *Maj., MC, USA*
John J. Ward, *Capt., MSC, USA*
David W. Wardell, *Maj., MC, USA*
Rolla D. Willard, *First Lt., MC, USA*
Stanley C. Wordley, *Maj., MSC, USA*
Harold R. Yarbro, *Lt. (jg), MC, USNR*

AIR MEDAL

Earl L. Russell, Jr., *Capt., MSC, USA*

COMMENDATION RIBBON

Oliver K. Agee, *Capt., MC, USA*
Robert A. Alderson, *Lt. (jg), MC, USNR*
Masao Amano, *First Lt., USAF (MSC)*
John L. Ballack, *2d Lt., MC, USA*
Lowyd W. Ballantyne, *Col., USAF (MC)*
Tyre E. Banks, Jr., *Lt., MC, USNR*
Bernard A. Bellow, *Lt., MC, USNR*
Merrice A. Bender, *Lt. (jg), MC, USN*
Alvin W. Bronwell, *Capt., MC, USA*
David B. Carmichael, Jr., *Lt., MC, USN*
John F. Chace, *Comdr., MC, USN*
John H. Cheffly, *Lt. Comdr., MC, USN*
Jack T. Chisholm, *Lt. (jg), MC, USNR*
Francis X. Claps, *First Lt., MC, USA*
George Coican, *First Lt., MSC, USA*
Paul B. Cooke, *First Lt., MSC, USA*
Frank S. Damazo, Jr., *Capt., MC, USA*
Edna M. Daughtry, *Lt., NC, USN*
Vincent M. Downey, *Lt. Col., USAF (MC)*
Robert W. Eastman, *Lt. (jg), MSC, USN*
John F. Egan, *Lt. (jg), MC, USNR*
Donald J. Ferguson, *Lt. Col., USAF (MSC)*
Richard G. Floria, *First Lt., MSC, USA*
William S. Francis, *Comdr., MC, USN*
William W. Franklin, *Col., USAF (DC)*
Carl W. H. Fredricksen, *Maj., USAF (MSC)*
Bernard Geltzer, *Lt. (jg), DC, USNR*
Harland W. Gerds, *Lt. (jg), DC, USNR*
David O. Hamrick, *Ens., MSC, USN*
Ralph W. Handy, *Lt., DC, USN*
Edgar V. Hansen, *Lt. (jg), DC, USNR*
Howard E. Hansen, *Lt. (jg), MC, USNR*
Edward C. Hinz, *Lt., MSC, USN*
Barbara M. Hodgkins, *First Lt., NC, USA*
Russell B. Hofstad, *Capt., DC, USA*
Edward A. Holdren, *Capt., MSC, USA*
Park C. Jeans, *Capt., MC, USA*
Robert K. Lewis, *Ens., MSC, USN*
Robert S. MacDonough, *CWOHC, USN*
Oscar T. McDonough, Jr., *Comdr., MC, USN*
James B. McKinnon, *HOWC, USN*
William McKown, *First Lt., MC, USA*
Frank J. Morgan, Jr., *Lt. (jg), MC, USNR*
George W. Morrison, *First Lt., DC, USA*
William B. Neal, *Lt. Comdr., MC, USNR*
Ruffus H. Newton, *First Lt., MSC, USA*
Richard E. Olson, *First Lt., MC, USA*
Richard J. O'Shea, *First Lt., MC, USA*
Harold V. Palmer, *Lt., MC, USN*
John A. Powers, *Capt., MC, USA*
Henry A. Roman, *First Lt., MC, USA*
Merrill W. Rusher, *Lt. Comdr., MC, USN*
Augustine M. Salcido, *Capt., MSC, USA*
John A. Salomone, *2d Lt. MSC, USA*
Harry C. Sammons, *Lt. (jg), MC, USNR*
George N. Sasamoto, *First Lt., DC, USA*
Donald M. Schroder, *First Lt., MSC, USA*
Richard L. Schwartz, *Capt., USAF (MC)*
William E. Skinner, *First Lt., MC, USA*
Anna M. Smyth, *First Lt., NC, USA*
William M. Snowden, *Comdr., MC, USN*
Arthur H. Stein, *Lt. (jg), MC, USNR*
Francis J. Stenger, *2d Lt., MSC, USA*
Barbara L. Taurish, *Ens., NC, USN*
Samuel C. Taylor, *Lt., MC, USNR*
John F. Test, *Lt. (jg), MC, USNR*
Frederick Van Poznak, *Lt. (jg), MC, USNR*
Frank P. Watson, *First Lt., MSC, USA*
Fitz John Weddell, Jr., *Capt., MC, USN*
Doren F. Wehrley, *Lt., DC, USNR*
Vernon H. Wold, *First Lt., MSC, USA*
Harold E. Wood, Jr., *Lt., MC, USN*
Marion T. Yates, *Comdr., MC, USN*
Henry E. Zeranski, *Capt., MSC, USA*

A MESSAGE FROM THE A. M. A.

Last month, in the first article of this series, Dr. Edward J. McCormick, President of the American Medical Association, referred to the Association's interest in physicians in uniform. While it is impossible to date the inception of our concern with military medical affairs, it is safe to talk about the tremendous increase in the activities in this field during the last 10 years. The acceleration of this work during World War II culminated in a joint survey by the Association and the armed services of the 55,000 civilian physicians who were called to duty during the war to determine the effects of their withdrawal on the welfare of the country.

The results of that survey led to the creation, in June 1947, of the Council on National Emergency Medical Service Although many of the other councils, bureaus, and departments of the Association are concerned with related problems, the Council on National Emergency Medical Service has been charged with the primary responsibility in matters relating to the nation's medical service in time of national emergency.

In its specific projects and day-to-day liaison with the armed services, the Council has made a sincere effort to help rather than to obstruct. It has always maintained, however, that civilian participation in military medical planning is imperative.

One of the principal interests of the Council during the past several years has been the "Doctor Draft Law." Since the passage of that legislation in September 1950, an attempt has been made to (1) facilitate and increase the efficiency of the administration of the law; (2) effect a timely and orderly system of recall and rotation of medical reservists; (3) prevent a repetition of the medical overstaffing that occurred in World War II; and (4) curtail the utilization of medical personnel on nonprofessional assignments and in the treatment of dependents of service personnel.

There are many less publicized but equally important activities of the Council that are conducted for the benefit of physicians in service. One of these that began about 18 months ago,

---

From the Council on National Emergency Medical Service of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense—*Editor.*

and which will be discussed more fully in a later article, is a continuing survey of physicians released from active military service. The results of this survey will be used as the basis for a series of conferences with the Assistant Secretary of Defense (Health and Medical) and the Surgeons General, designed to improve further the utilization of medical personnel by the armed services and to formulate a more effective voluntary officer procurement program. Another project has been planned to acquaint physicians being released from active service with existing opportunities in civilian medical fields.

This program, which was inaugurated by the Council in July 1952, with the co-operation of the department of Defense and the Selective Service System, has the enthusiastic endorsement of the state medical societies and the chairmen of the Selective Service medical advisory committees.

After receiving the names of physicians to be released from active duty, the Council communicates with each of them to determine his postservice plans, his medical qualifications and specialty, as well as the name of the state in which he prefers to work. The names of physicians interested in receiving additional information are then sent to the Selective Service medical advisory committees and to the executive secretaries of the appropriate state medical societies. While these names were forwarded initially for the primary purpose of obtaining replacements for physicians temporarily deferred under the "Doctor Draft Law," the project now has greater value as a location service for physicians returning to civilian life. In communicating with state medical societies, the Council uses the established procedures for placement of physicians that have been followed for some time by the Council on Medical Service of the Association.

From 28 July 1952 to 1 January 1954, letters were sent to 5,845 individual physicians. Of this number 1,131 requested further information.

It is the earnest hope of the Council and the Association that the program will be of real assistance to individual physicians and to state medical societies, and that it will be successful in the satisfactory location of many physicians upon their release from active duty. Any physician on active duty, or who recently has been released from service, interested in receiving this service should communicate directly with the Secretary of the Council, 535 N. Dearborn Street, Chicago 10, Ill.

Regular Medical Corps Officers Certified by Specialty Boards

American Board of Psychiatry and Neurology

Organized in 1934, this specialty board on 30 June 1953 had granted certification to 4,646 physicians to become the fourth largest American Board. A separate certificate is given in psychiatry and in neurology, and two certifications or a combined certificate to those qualified in both fields. A total of 79 regular Medical Corps officers of the three services are recognized as specialists by this board. They are:

PSYCHIATRY AND NEUROLOGY

Alex L. Brown, *Lt. Col., USA*

John M. Caldwell, Jr., *Col., USA*
Rawley E. Chambers, *Brig. Gen., USA*
Roy E. Clausen, Jr., *Lt. Col., USA*
Henry S. Colony, *Comdr., USN*

Albert J. Glass, *Col., USA*

Emmett B. Litteral, *Col., USA*

George N. Raines, *Capt., USN*
Stephen W. Ranson, *Lt. Col., USA*

Robert L. Williams, *Maj., USAF*

PSYCHIATRY

William H. Anderson, *Lt. Col., USA*

James M. Bailey, *Lt. Col., USA*
Warren J. Barker, *Lt. Col., USA*
Thomas G. Baskin, *Capt., USA*
Eaton W. Bennett, *Col., USA*
Reginald V. Berry, *Comdr., USN*
Charles T. Brown, *Lt. Col., USA*
John W. Burkett, *Maj., USA*

Richard R. Cameron, *Lt. Col., USA*
Elmer L. Caveny, *Capt., USN*
Robert L. Christensen, *Maj., USA*
Robert M. Counts, *Capt., USA*

James F. Donovan, *Maj., USA*

David S. Evans, *Lt. Col., USAF*

Charles S. Finch, Jr., *Lt. Col., USA*

David C. Gaede, *Capt., USN*
Lucio Gatto, *Col., USAF*

Raymond L. Hack, *Lt. Col., USA*
Robert P. Hargreaves, *Lt. Col., USA*
Thomas A. Harris, *Comdr., USN*
Thomas B. Hauschild, *Maj., USA*
William Hausman, *Maj., USA*
Frank Hladky, Jr., *Maj., USA*
Bartholomew W. Hogan, *Rear Adm., USN*
Joseph J. Hornisher, *Col., USA*

Eugene R. Inwood, *Col., USA*

Richard G. Johnson, *Capt., USA*

John Kavanagh, *Maj., USAF*
Julian C. Kennedy, *Lt. Col., USA*
Edward J. Kollar, Jr., *Maj., USAF*

This is the fifth of a series. The names of officers certified by the American Board of Orthopedic Surgery will be published in the March issue.

PSYCHIATRY—Continued

Harry H. Lipcon, *Comdr., USN*

John J. Marren, *Col., USA*
Thomas W. McDaniel, *Capt., USN*
John F. McMullin, *Capt., USN*
Alva E. Miller, *Col., USA*
Clarence S. Miller, *Maj., USA*
Stephen Mourat, *Lt. Col., USA*
Richard F. Mulholland, *Lt. Col., USA*
Charles S. Mullin, Jr., *Comdr., USN*

Ira C. Nichols, *Capt., USN*

Felix H. Ocko, *Comdr., USN*

Marvin E. Perkins, Jr., *Maj., USA*
Donald B. Peterson, *Col., USA*

Thomas P. Rogers, *Capt., USN*
Marion E. Roudebush, *Capt., USN*

Paul J. Schrader, *Lt. Col., USA*

Lionel A. Schwartz, *Capt., USA*
Roger D. Sherman, *Comdr., USN*
Mervyno Shoor, *Comdr., USN*
Gerald W. Smith, *Capt., USN*
Phillip B. Smith, *Lt. Col., USA*
Stephen M. Smith, *Capt., USN*
James N. Sussex, *Comdr., USN*
Robert E. Switzer, *Lt. Comdr., USN*

John W. Thomas, *Comdr., USN*
Samuel V. Thompson, *Comdr., USN*
Richard E. Troy, *Maj., USAF*
Jay F. Tuttle, *Lt. Col., USA*

Robert L. Wagner, *Comdr., USN*
Oswald M. Weaver, *Lt. Col., USA*
William E. Wilkinson, *Col., USA*
James N. Williams, *Capt., USN*
Frances L. Willoughby, *Comdr., USN*

Albert J. Zuska, *Comdr., USN*

NEUROLOGY

John W. Kemble, *Col., USA*

Arthur J. Levens, *Lt. Col., USA*

Peter P. Machung, *Comdr., USN*

Willard H. Pennell, *Capt., USAF*

John W. Sumner, Jr., *Lt. Col., USA*

Handicapped Workers in Industry

Physicians interested in occupational medicine can be of great service to the disabled by educating industry to the physical capacities of handicapped workers. Long accustomed to thinking in terms of disease, doctors are now beginning to think in terms of health. The residual capacities of the patient are at least as important to his adjustment as the physical defect. Physicians must train their sights on what the patient has left; with a positive, forward-looking approach, physicians can help place qualified handicapped workers in industry. The necessity of restoring handicapped persons to productive work is especially important at this time of manpower shortage. The potential abilities of the disabled must be developed, not only for their benefit but to the advantage of the nation as a whole.

—HENRY H. KESSLER, M. D.
in *Journal of the International College of Surgeons*, p. 372, Sept. 1953

Publications by Officers of the Medical Services

Benke, A. R., Capt., MC, USN: Relation of lean body weight to metabolism and some consequent systematizations. *Ann. New York Acad. Sc.* 56: 1095-1142, Nov. 17, 1953.

Boysen, J. E., Lt. Col., USAF (MC): Hyperthermic and pathologic effects of electromagnetic radiation (350 mc). *A. M. A. Arch Indust. Hyg.* 7: 516-525, June 1953.

Branson, E. C., Capt., MC, USA: Fractures of carpal navicular; accurate diagnosis and planned treatment. *New England J. Med.* 249: 884-886, Nov. 26, 1953.

Brown, R. B., Capt., MC, USN; Hufnagel, C. A.; Pate, J. W., Lt. (jg), MC, USNR; and Strong, W. R., Lt., MC, USNR: Freeze-dried arterial homografts. *Surg., Gynec. & Obst.* 97: 657-664, Dec. 1953.

Chamberlain, J. M.; Storey, C. F., Capt., MC, USN; Klopstock, R.; and Daniels, C. F.: Segmental resection for pulmonary tuberculosis (300 cases). *J. Thoracic Surg.* 26: 471-485, Nov. 1953.

Crosby, W. H., Lt. Col., MC, USA: Paroxysmal nocturnal hemoglobinuria; report of case complicated by an aregenerative (aplastic) crisis. *Ann. Int. Med.* 39: 1107-1117, Nov. 1953.

Currence, W. W., Lt. Col., MC, USA: Hypothermia in etiology of retrolental fibroplasia. *Arch. Pediat.* 70: 326-332, Oct. 1953.

Davis, J. H., Jr., Capt., MC, USA; Artz, C. P., Maj., MC, USA; Reiss, E., Capt., MC, USA; and Amspacher, W. H., Col., MC, USA: Practical technics in care of burn patient. *Am. J. Surg.* 86: 713-717, Dec. 1953.

DeCoursey, E., Brig. Gen., MC, USA: George R. Callender; biographical sketch. *Lab. Invest.* 2: 437-440, Nov.-Dec. 1953.

Dudley, H. C., Comdr., MSC, USN: Pharmacological studies of radiogermanium (Ge^{71}); inhalation of dusts. *A. M. A. Arch. Indust. Hyg.* 8: 528-530, Dec. 1953.

Fellers, F. X., Maj., USAF (MC): Agglutination studies in visceral larva migrans. *A. M. A. Am. J. Dis. Child.* 86: 767-771, Dec. 1953.

Fry, W., Comdr., MC, USN: Herniation of left auricle. *Am. J. Surg.* 86: 736-738, Dec. 1953.

Giges, B., Capt., MC, USA; Dein, H. L., Lt. Col., MC, USA; Sborov, V. M.; Seligson, D., Capt., MC, USA; and Howard, J. M., Capt., MC, USA: Experimental hepatic coma. *Surg., Gynec. & Obst.* 97: 763-768, Dec. 1953.

Ginn, L. H., Jr., Brig. Gen., MC, USA, and Ziperman, H. H., Lt. Col., MC, USA: Surgery in division clearing stations. *Mil. Surgeon* 113: 443-447, Dec. 1953.

Goddard, C. H., Col., MC, USA: Interrelated laboratory activities of Army Medical Service and Military Police Corps. *Mil. Surgeon* 113: 466-477, Dec. 1953.

Goyette, E. M., Col., MC, USA: Acute idiopathic pericarditis. *Ann. Int. Med.* 39: 1032-1044, Nov. 1953.

Green, G. W.; Haynes, J. W., Maj., USAF (MC); Dozier, M., Maj., MC, USA; Blumberg, J. M., Col., MC, USA; and Bernier, J. L., Col., DC, USA: Primary malignant melanoma of oral mucosa. *Oral Surg.* 6: 1435-1443, Dec. 1953.

Hardaway, R. M., III, Lt. Col., MC, USA, and Istrow, B. H., First Lt., MC, USA: Adenocarcinoma of small bowel. *Virginia M. Monthly* 80: 669-670, Dec. 1953.

Hoadley, M. E., Maj., USAF (AFNC): Nursing the respirator patient during flight. *J. Nursing* 53: 826-829, July 1953.

Karsner, H. T., and Phillips, R. A., Comdr., MC, USN: Academic freedom in military medical research. *J. A. M. A.* 153: 1356-1357, Dec. 12, 1953.

Kimbrough, J. C., Col., MC, USA, and Cook, F. E., Jr., Maj., USAF (MC): Carcinoma of testes. *J. A. M. A.* 153: 1436-1437, Dec. 19, 1953.

Lodmell, E. A., Col., MC, USA: Roentgenological manifestations of injury to cardiovascular system. *Nebraska M. J.* 38: 423-429, Dec. 1953.

Manning, P. R., First Lt., MC, USAR; Jones, P. N.; and Bigham, R. S., Jr., Maj., USAF (MC): Clinical studies with carbomycin. *New England J. Med.* 249: 758-761, Nov. 5, 1953.

McManis, T. F., Col., DC, USA; Dehne, E., Lt. Col., MC, USA; and Bingham, C. B., Capt., DC, USA: Specific antibiotic therapy for an iliac bone graft in mandible; report of case. *Oral Surg.* 6: 1396-1404, Dec. 1953.

Pate, J. W., Lt., MC, USNR, and Sawyer, P. N., Lt., MC, USNR: Some elastic characteristics of fresh and freeze-dried aortic grafts. *Am. J. Surg.* 86: 653-658, Dec. 1953.

Piper, W. N., Lt. Col., MC, USA, and Kuitert, J. F., Lt. Col., MC, USA: Mechanical adjuvant for dermatological baths. *A. M. A. Dermat. & Syph.* 68: 726-728, Dec. 1953.

Pulaski, E. J., Lt. Col., MC, USA: War wounds. (Medical Progress section) *New England J. Med.* 249: 890-897, Nov. 26, 1953, and 932-938, Dec. 3, 1953.

Reals, W. J., Capt., USAF (MC); Jarman, J. A., Col., USAF (MC); and Beattie, R. T., First Lt., USAF (MSC): Protein bound iodine determination in military hospital. *Mil. Surgeon* 113: 478-483, Dec. 1953.

Richardson, F. H., Col., USAF (DC), and Cohen, B. M., Capt., USAF (DC): Multiple facial fractures; report of case. *Oral Surg.* 6: 1373-1385, Dec. 1953.

Ryder, H. W.; Rosenauer, A.; Penka, E. J., Lt., MC, USN; Espey, F. F.; and Evans, J. P.: Failure of abnormal cerebrospinal fluid pressure to influence cerebral function. *A. M. A. Arch. Neurol. & Psychiat.* 70: 563-586, Nov. 1953.

Silverman, J. J., and Littman, D. S., Lt. (jg), MC, USNR: The cardiologist looks at the hand. *New England J. Med.* 249: 839-842, Nov. 19, 1953.

Steelman, H. F., Capt., MC, USA; Hayes, G. J., Lt. Col., MC, USA; and Rizzoli, H. V.: Surgical treatment of saccular intracranial aneurysms. *J. Neurosurg.* 10: 564-576, Nov. 1953.

Walker, S. H., Maj., MC, USA: Ineffectiveness of aureomycin in primary atypical pneumonia. *Am. J. Med.* 15: 593-602, Nov. 1953.

Willner, C. E., Lt., MC, USNR: War wounds of thoracic respiratory apparatus. *Surg., Gynec. & Obst.* 97: 735-747, Dec. 1953.

Winer, A. D., First Lt., MSC, USA, and Kuhns, D. M., Col., MC, USA: Calcium determination by flame spectrophotometry; rapid method for 0.1-ml. samples. *Am. J. Clin. Path.* 23: 1259-1262, Dec. 1953.

BOOK REVIEWS

ABSTRACTS ON MILITARY AND AVIATION OPHTHALMOLOGY AND VISUAL SCIENCES, Volumes I and II, by *Conrad Berens,* M. D., and *L. Benjamin Sheppard,* M. D. Vol. I, 539 pages. Vol. II, 425 pages. The Biological Sciences Foundation., Ltd., Washington, D. C., 1953. Price $40, set.

In this significant work that has been in preparation for several years, nearly 2,500 published articles from world-wide sources are made available in condensed form. The authors, who are distinguished in their specialty, have rendered a valuable service by its publication to military physicians, ophthalmologists, and to those engaged in aviation medicine and in the visual sciences. They have, in addition, directed attention to the importance of visual defects and ocular pathology in both military and aviation medicine.

The first volume of the set contains abstracts through 1940; the second covers the World War II period through 1945. There are forewords by Major General R. W. Bliss, USA (Ret.), former Surgeon General of the Army, and Major General Malcolm C. Grow, USAF (Ret.), the first Surgeon General of the Air Force. Each volume contains an extensive table of contents listing the subject matter alphabetically so that the reader need only look under the general heading in which he is interested in order to find a specific topic. For example, the subject of depth perception is divided into 16 topics, from accidents to visual acuity, also listed alphabetically. This expanded table of contents serves in lieu of an index, and is a satisfactory substitute in a work which must necessarily include many cross references to aid the reader. The addition of an author index would have been helpful.

The abstracts are clearly written and vary from a few lines to a page or more, depending on the importance of the article. Because of his early research achievements in aviation ophthalmology for the Air Service of the Army in World War I, Dr. Berens was able to select judiciously for abstracting from among the many reports that have appeared in foreign journals. The usefulness of the books is broadened by the inclusion of a large number of publications on aviation medicine which are only partially or indirectly related to ophthalmology.

These volumes will be welcomed by those who are concerned with the published reports in the fields they cover. Unfortunately, the high price of the set will tend to restrict it to libraries and reference collections, but it will nonetheless fulfill its commendable purpose.—*Col. R. J. Benford, USAF (MC)*

WATER, ELECTROLYTE AND ACID-BASE BALANCE, Normal and Pathologic Physiology as a Basis for Therapy, by *Harry F. Weisberg,* M. D. 245 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md., 1953. Price $5.

This book presents a clear and concise consideration of the subject. It is divided into two sections, the first devoted to normal physiology and the second to pathologic physiology. The essential information is explained simply and clearly, and summarized in excellent tables. Much of the redundant material found in other books on the subject, and the presentation of representative cases, which are found in many works of this sort, have been eliminated. Many controversial points are handled skillfully and the only minor criticism is the failure to follow up the introduction of the Bronsted terminology with a truly modern description of the acid-base phenomenon.

This book is recommended for the student and practitioner who wish to become acquainted with the modern conception of water and electrolyte balance. It contains a complete glossary of terms and an excellent index, as well as a complete bibliography, which will render it particularly usable to advanced students of fluid balance problems.

—*Lt. Col. F. M. Townsend, USAF (MC)*

PITUITARY CHROMOPHOBE ADENOMAS, Neurology Metabolism Therapy, by *John I. Nurnberger,* M. D., and *Saul R. Korey,* M. D. 282 pages; illustrated. Springer Publishing Co., Inc., New York, N. Y., 1953. Price $7.

This monograph on pituitary chromophobe adenomas, according to the authors, attempts "to correlate information from several medical disciplines in order to portray the syndrome of chromophobe adenoma of the pituitary in its setting of modified function." The authors have supplemented their text in this difficult task with about 500 references to the literature.

The monograph reports the results of clinical studies of 117 patients. The tumor-cell type, its location, and its effect upon neighboring structures were verified surgically or by autopsy in 115 instances. In addition the general anatomy and physiology of the pituitary and hypothalmus, and the effect of deranged "sellar" function upon the other endocrine structures, are summarized.

Obviously the many facets of the pituitary hypothalamic syndrome can only be indicated in so short a space, but neverthe-

less this monograph serves such a purpose well and should be of interest to internists, neurologists, and neurosurgeons.

—Lt. W. F. Stafford, MC, USNR

ATLAS OF REGIONAL DERMATOLOGY, by *Ernest K. Stratton*, M. D.; *Harry L. Arnold, Jr.*, M. D.; *Maurice J. Costello*, M. D.; *Lewis A. Koplik*, M. D.; and *Paul Fasal*, M. D. 274 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $15.

This new work presents in picture form the various dermatoses, primarily for the student who needs visual help in identifying skin diseases. There are 540 black and white clinical photographs and 21 photomicrographs, divided into eight regional groupings with a classification of the diseases of each region.

Brief descriptions accompany less than half of the pictures. A few diseases have descriptions appearing more than once; psoriasis is described similarly in six different regions. Other diseases are not described anywhere in the book and are accompanied only by a title. No bibliographies are listed. Although a wide range of dermatoses is presented, many skin diseases are not illustrated.

The photographs are, in general, excellent and the student would do well to use them in his studies and reviews. It would be better if the inadequate discussions of treatment were left out, as they are not always modern in concept and will tend to become less so, thus decreasing the permanent value of the book. The space gained could be used to advantage for more extensive differential diagnoses in the present descriptions, or descriptions might be given for some of the illustrations that have only a title.

Dr. Arnold contributed a section on "Leprosy" with thirteen photographs and three photomicrographs. It is seldom that one sees a subject presented in so concise, so clear, and yet so complete a manner. Dr. Costello's contribution is a 10-page series of pictures with short discussions of "Skin Manifestations of the Acute Infectious Diseases." Pictures of erythema infectiosum, roseola infantum, and rickettsialpox, not ordinarily found in textbooks on dermatology, are included. The 31 color photographs, by Dr. Fasal, and other color pictures of skin conditions published in pamphlet form by various pharmaceutical manufacturers, show that in addition to location and structure, the color is characteristic and aids in visual study.

Generally speaking this book deserves commendable mention, but a complete, modern atlas in color, with standard nomenclature, must be produced before the student and the practitioner will profit from its use, as they might.

—Capt. W. N. New, MC, USN

BAILEY'S TEXT-BOOK OF HISTOLOGY, revised by *Philip E. Smith*, Ph. D., Sc. D., and *Wilfred M. Copenhaver*, Ph. D. 13th edition. 775 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md., 1953. Price $9.

During the five years since the publication of the twelfth edition of this justifiably popular textbook of histology, much has been learned about the relationships between structure and function, and spectacular advances have been made in electron microscopy and histochemistry. The new, thirteenth edition incorporates these advances and other important results of recent study and research.

Numerous passages and sections have been entirely rewritten, notably a major part of the chapters on the reproductive systems, the endocrine glands, and the organs of special senses. Among the many new illustrations, which include six color plates, are some excellent reproductions of electron micrographs. The structure of mitochondria is particularly well illustrated. Additional pertinent references have been added to the bibliographies following almost every chapter.

This standard text, which is about to enter its fiftieth year of widespread use both here and (more recently) in Spanish language countries abroad, is meant primarily for medical and dental students, rather than for teachers and research workers. It is clearly written, well indexed, and authoritative.

—*Capt. B. F. Avery, MC, USN*

ADVANCES IN PEDIATRICS, edited by *S. Z. Levine*. Vol. 6. 323 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1953. Price $7.50.

This volume presents seven monographs of current interest especially to the pediatrician. The subjects are covered comprehensively by recognized authorities in their respective fields. Four of the contributions pertain to the neonatal period, emphasizing the importance of this area in pediatrics: "Preventive Prenatal Pediatrics," "Intestinal Obstruction in the Neonatal Period," "Hemolytic Disease of the Newborn," and "Pulmonary Pathology in the Newborn." The other three subjects, "Lymphosarcoma in Childhood," "The Lipoidoses" and "Megaloblastic Anemia of Infancy" serve well the purpose of this series of annual reviews: to keep the physician informed of recent advances and to chart future trends in pediatric research.

The style is pleasing, and necessary photographs of good quality and clear illustrative charts are presented. Each subject has an extensive bibliography, and subject and author indexes are contained in the last 17 pages. Where a good pediatric library is desired, this volume should be included. No better reference of subjects covered is available.—*Col. O. C. Bruton, MC, USA*

HYPERSPLENISM AND SURGERY OF THE SPLEEN, by *William Dameshek*, M. D., and *C. Stuart Welch*, M. D. 84 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1953. Price $10.

This is a revision of the authors' well-known atlas entitled "Spleen and Hypersplenism." Concise and instructive new material has been added to the sections on hemolytic anemias and idiopathic thrombocytopenia. The section on splenic surgery, illustrated in color, is enhanced by a presentation of the recent advances and methods for splenectomy and for the relief of portal hypertension.

This volume is a significant contribution, and presents in graphic style both sides of a complex, controversial subject. One of the most valuable attributes of this book is the authors' own findings and their concepts of the functions and dysfunctions of the spleen. The text makes abundant use of representative case histories with photographs and photomicrographs. The splenic syndromes are introduced by a brief but adequate description of the histology and physiology of the spleen. The section on indications and contraindications for splenectomy is of particular interest. A subject index with page references would facilitate the use of this atlas.

This book will serve as an excellent reference for those concerned with the hematologic aspects of internal medicine and for surgeons interested in the recent advances in the treatment of hematologic disorders. For those who are intrigued by the complex functions of the spleen, this volume will initiate further investigation into its function and dysfunction.

—Lt. Comdr. G. R. Saraniero, MC, USN

THE YEAR BOOK OF OBSTETRICS AND GYNECOLOGY (1953-1954 Year Book Series), edited by *J. P. Greenhill*, B. S., M. D. 567 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1953. Price $6.

This book covers by abstract the literature on obstetrics and gynecology which appeared during the 12 months immediately following publication of the 1952 edition. From the excessively voluminous literature the editors have winnowed out the newest and most thought-provoking articles, together with those requiring re-emphasis. To many of the lucid, concise abstracts the editor has added his own comments. He states his ideas clearly and without equivocation, and with tolerance when in disagreement.

This is a useful volume and should be readily available to all who practice obstetrics or gynecology as a quick reference to the recent literature. However, it should not be considered as "the gospel." The size of the book, the highly legible type, and excellent index make it a pleasure to read.

—Col. J. W. Simpson, MC, USA

THORACIC SURGERY AND RELATED PATHOLOGY, by *Gustaf E. Lindskog*, M. D., and *Averill A. Liebow*, M. D. 644 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y., 1953. Price $15.

This excellent book fulfills a real need. Although several worth-while monographs and technical manuals pertaining to thoracic surgery have appeared within recent years, not since the publication in 1935 of "Surgical Disorders of the Chest" by Graham, Singer, and Ballon has there appeared a comprehensive and authoritative text devoted to this subject. Thoracic surgery was almost in its infancy at the time of publication of Graham's book, there is no doubt that the specialty has made tremendous strides since that time. The authors of this volume have covered the new developments in this rapidly expanding field in an admirable manner. The result is a book that can be recommended without hesitation to all who are interested in this specialty.

In this treatise no important thoracic surgical subject has been neglected and all are discussed clearly, concisely, and adequately. There is excellent correlation between the clinical symptoms, the physical findings, and the pathologic features of the various disorders. The rationale of the surgical procedures utilized in the management of each of them is made clear. Numerous surgical technics have been devised for the treatment of many of the lesions of the chest and it would be quite impracticable to describe all of them in detail in a volume of this type. The authors have exercised rare judgment in selecting for description those operations that are most widely used and generally accepted.

Nowhere in this fast-advancing field have the changes been more swift than those related to the surgical treatment of pulmonary tuberculosis. This is underlined by the fact that the authors added a footnote modifying the policy governing the employment of continuous combined chemotherapy advocated in the original manuscript. The fact that this change was incorporated exemplifies the up-to-date nature of the book.

One hesitates to find any fault with a work of such general excellence. This reviewer is disturbed, however, to find the indications for resection in pulmonary tuberculosis restricted to those that are traditional and time-honored; namely, round discrete foci, bronchostenosis, tuberculous bronchiectasis, thoracoplasty failures, malignancy suspects, the totally destroyed lung (especially with empyema), and lower lobe cavitation (especially of the tension type). Practically everyone agrees with these indications, but there are many who believe that the small localized lesion, confined to one or two segments, can be managed more quickly, safely, and with greater assurance of success by

segmental resection than in any other manner. Whereas the authors advocate excisional surgery only for the patient whose lesion could probably be managed successfully in no other manner, many qualified observers now are convinced that resection is the procedure of choice in many properly prepared and wisely selected patients who could probably be treated successfully by any one of a variety of methods. This and other minor objections do not alter the fact that the authors have done an outstanding job in their discussion of surgical disorders of the chest wall, lungs, pleura, mediastinum, esophagus, heart, and great vessels.

Every doctor interested in surgical conditions of the chest should own a copy of this book. It is well illustrated, adequately indexed, and there is an excellent bibliography at the end of each chapter.—*Capt. C. F. Storey, MC, USN*

CLINICAL DISORDERS OF THE HEART BEAT, by *Samuel Bellet*, M. D. 373 pages; 164 illustrations. Lea & Febiger, Philadelphia, Pa., 1953. Price $8.50.

The discussion of cardiac arrhythmias plays a prominent role in most general textbooks of medicine as well as those limited to clinical cardiology, yet this book is entirely and effectively devoted to a presentation of this subject. Current data is clearly correlated and reviewed in detail in such form that it can be readily appreciated and applied by the student, the teacher, the general practitioner, and the specialist in cardiology, internal medicine, anesthesiology, and surgery.

The contents are presented in four main sections: (1) general considerations, which stresses in particular basic pathophysiology and general principles; (2) a discussion of individual arrhythmias, which presents the manifestations, diagnosis, and treatment of each disorder and gives details of mechanisms; (3) the arrhythmias in certain clinical states, which include not only those commonly considered but also those associated with pregnancy, anesthesia, surgery, angiocardiography, cardiac catheterization, and trauma; (4) drugs used in therapy of arrhythmias. Each section is essentially complete in accordance with its general heading, so that there is repetition when the book is viewed in its entirety. Nevertheless, the repetition is of definite advantage, whether one uses the book as a test or a reference. In areas of controversy and differences of opinion, the salient features of the various controversial aspects are well presented and in each instance the author concludes with the opinions he believes are most logical in the light of present knowledge.

This book is well organized, well written, and well illustrated, and has an excellent bibliography. It should be a definite asset to any library.—*Capt. J. H. Ward, Jr., MC, USN*

STUDY GUIDE FOR CLINICAL NURSING, a Co-Ordinated Survey Integrated With Essentials of the Basic Sciences, prepared under the direction of *Emily C. Cardew,* R. N., M. S. 563 pages. J. B. Lippincott Co., Philadelphia, Pa., 1953. Price $6.

This is a volume prepared primarily for two groups of nurses: clinical students and instructors. The editor's explanatory preface focuses clearly and concisely upon the intended function of the volume as a guide. Flexibility in its use is invited in accordance with individual needs and circumstances. Upon this factor the extent of its real usefulness depends.

A problem-solving approach to nursing care planning is employed by the authors. Its inclusiveness implies that such care originates prior to the admission of a patient and terminates when he resumes his place in the community. In the interest of this interpretation the following factors are consistently considered: prophylaxis, early diagnosis, fears, special technical needs, nutrition, nationality, teaching plan (patient), cosmetics, rehabilitation, and available auxillary community facilities.

In its treatment of the basic science of human growth and development the book is sound; in its design to motivate thinking in terms of mass disaster it is timely. Nursing care of the total patient, on an individual basis, is a growing concept among nurses. In the light of this idea, this book should be of interest and value to intructors and graduate students.

—Lt. L. B. Schoonover, NC, USN

THE OBSTETRICAL FORCEPS, by *L. V. Dill,* M. D. 156 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $5.25.

This monograph describes and illustrates the different methods of forceps application, traction, and rotation in normal as well as abnormal fetal presentations. An introductory historical chapter adequately covers the development and use of the obstetrical forceps from its inception to its place in current practice. The chapter discussing the reasons for the selection of a specific forceps for a particular obstetrical problem is logically conceived. Many uncontestable points are noted to alter the adage that "one forceps learned well is better than many types poorly learned."

The author has made a successful effort to crystallize the concept of forceps use in contemporary practice. The illustrations are numerous and clear, but are frequently so placed in the text that they cannot be followed with ease, as they are explained.

This concise and easily understood presentation will be useful as an adjunct in teaching good obstetrical technic, as well as a guide to the general practitioner who does obstetrics.

—Comdr. M. A. Godinez, MC, USN

INHALATION THERAPY AND RESUSCITATION, by *Meyer Saklad,* M. D. 343 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $7.50.

This monograph belongs in the general category of a medical reference book rather than a textbook. The author's objective is to clarify much of the confused terminology and nomenclature, and to present in a brief, clear manner, much of the previously written material on the subject.

The author's style is simple and easily understandable, even to those not familiar with the field. His format is logical and the subdivisions and minor categories are not excessive. There were no obvious errors though several points are of a controversial nature. Photographs are more numerous than schematic drawings and graphs. The author indicates each source by number in an extensive bibliography. The index is complete and contains reference to every item of subject matter, equipment, technic, and to authors cited. There are three sections of the book which could have been more elaborately treated, viz., the transport of oxygen and carbon dioxide in the blood, helium inhalation, and cardiac resuscitation.

The book is a clearly written, concise, and complete text on the subjects of its title. It is recommended for anesthesiologists, residents in training, nurse anesthetists, and oxygen therapy technicians.—*Col. F. C. Dye, USAF (MC)*

THE MANAGEMENT OF PAIN, With Special Emphasis on the Use of Analgesic Block in Diagnosis, Prognosis, and Therapy, by *John. J. Bonica,* M. D. 1,533 pages; 785 illustrations on 444 figures. Lea & Febiger, Philadelphia, Pa., 1953. Price $20.

This volume on the challenging problem of pain and its management is timely and long needed. The author's extensive personal experience with the treatment of pain syndromes enhances its value. The book is composed of three parts. The first includes the fundamental considerations of pain. Part two deals with methods and technics of managing pain. In the third part various disorders with painful syndromes are presented which have been and can be managed with analgesic block, with or without the aid of other methods. The chapters on block technic are well written and contain many practical illustrations. There are also valuable contributions from various specialists in their approach to the problem in their respective fields. Although well written and carefully organized, this book is longer than necessary. There are parts that could be deleted without detracting from the basic concepts being presented. It is, however, an excellent reference-type book and will be of interest to the specialist in any branch of medicine who comes in contact with pain syndromes.

—*Lt. J. J. Marra, MC, USN*

285934 O—54——10

TESTS AND STANDARDS FOR NEW AND NONOFFICIAL REMEDIES, Containing Tests and Standards for Nonofficial Drugs and Dosage Forms Which Stand Accepted by the Council on Pharmacy and Chemistry of the American Medical Association on January 1, 1953. Issued by the *Chemical Laboratory, American Medical Association,* 1953. 327 pages. J. B. Lippincott Co., Philadelphia, Pa., 1953. Price $4.

For many years "New and Nonofficial Remedies" has been a valuable source of information on new drugs accepted by the American Medical Association Council on Pharmacy and Chemistry. A recent survey has shown that the physician and medical student find it valuable for its concise descriptions of the actions, dosage, and uses of new remedies while the pharmacist is interested chiefly in the physical descriptions, methods of assay, dosage forms, and tolerance limits of the same remedies. Tests and Standards for New and Nonofficial Remedies represents the separate publication of the material of pharmaceutical interest. This is a smaller, less expensive book, but its usefulness to the pharmacist and pharmaceutical chemist is unimpaired.

No textbook is revised frequently enough to keep up with the addition of new drugs and the Council has provided this annual means of bringing up to date the descriptions of those new drugs that have been submitted to it by pharmaceutical firms and found worthy of receiving its endorsement. Editing and compiling the monographs has been ably accomplished by Director Walter Wolman and his staff of the American Medical Association Chemical Laboratory. The result is a book essential to those in the pharmaceutical profession who must keep up with a rapidly changing field.—*Col. P. K. Smith, USAFR*

SURGICAL TECHNIQUE and Principles of Operative Surgery, by *A. V. Partipilo,* M. D., with 10 contributors. 5th edition. 704 pages. Lea & Febiger, Philadelphia, Pa., 1953. Price $15.

This is a thorough revision of an excellent book on general surgical technics with emphasis on surgical anatomy. The authors describe their own technics in which they are thoroughly familiar. It is illustrated with excellent drawings showing details of anatomy and surgical procedures. Other aspects of surgery are not covered. The material is rather elementary and basic, making excellent reading for a resident beginning in surgery. There are short chapters on chest, vascular, and plastic surgery and excellent presentations on fluid therapy, sutures and their use, and abdominal incisions. References and study questions are included after many chapters.

Unfortunately, several of the operations described in detail are obsolete. The local excision of duodenal ulcer, closed intestinal anastomosis, crushing method of colostomy closure, and open drainage of lung abscess are emphasized and the impression given that they are frequently done.

—*Lt. Col. R. M. Hardaway, III, MC, USA*

THE TROUBLED MIND, A Psychiatric Study of Success and Failure in Human Adaptation, by *Beulah Chamberlain Bosselman*, M. D. 206 pages. The Ronald Press Co., New York, N. Y., 1953. Price $3.50.

The author has met an unsatisfied demand from educators, religious groups, and informed laymen for an authoritative exposition of current thinking in psychiatry by describing personality as a process of success or failure in human adaptation.

The subject matter is presented under three main headings. First, successful adaptation is described from infancy and childhood through senility. This section describes clearly the process of personality development. In the second section, failure of adaptation is examined and its manifestations as neurosis and psychosis are discussed. This discussion would not satisfy a worker in the field, but is adequate for lay groups. In the final section, the author introduces a number of concepts of psychiatric treatment. This section is marred by an overcomprehensive approach. The attempt to group under one section such diversified subjects as dream interpretation, free association, responsibility of parents and technics of psychotherapy, is less successful.

Under suggestions for further reading the author lists about 100 books, many of which are too technical for most readers. The book as a whole fulfills its purpose and is recommended for those who work with people.—*Maj. J. F. Donovan, MC, USA*

PHYSICAL MEDICINE AND REHABILITATION, edited by *Basil Kiernander*, M. B., B. S., D. Phys. Med. 610 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $12.75.

This textbook has been written primarily for and will be of interest to the clinician who wishes to employ physical methods in diagnosis and treatment. The basic principles have been presented and their relationship to the various specialties in medicine has been integrated so that the reader will have a better understanding of the physical methods used in his own particular field.

The book may be divided into two sections. The first is primarily concerned with the basic sciences as related to physical medicine and rehabilitation. Such topics as functional anatomy, applied physiology, and physical methods used in diagnosis and treatment of neuromuscular disorders are discussed. In the second section the clinical application of the specialty is presented. Such fields as the rehabilitation of the injured, the hemiplegic, the arthritic and the geriatric patient are covered. In addition there are chapters on vocational rehabilitation, industrial resettlement, rehabilitation of chest and vascular disorders. There are also individual contributions on the application of physical medicine to dermatology, otolaryngology, ophthalmology, obstetrics and gynecology, and venereal disease.

The various chapters in the book indicate clearly the breadth and scope of physical medicine and emphasize the thorough training necessary for success in this specialty.

—*Lt. Col. R. C. Psaki, MC, USA*

EXPERIMENTAL ATHEROSCLEROSIS, by *Louis N. Katz*, M. D., and *Jeremiah Stamler*, M. D. 375 pages; 46 illustrations, 84 tables. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $10.50.

The field of research in certain subjects has become so large and the number of papers so great that the appearance from time to time of a review monograph is very helpful. The reader of such a monograph, however, must be on his guard against certain failings of such works which are inherent in them. As a rule, the authors are notable in the field for research and teaching. Unavoidably, their opinion and the trend of their particular investigations may be at variance with other authorities. If the reader keeps this in mind and is sufficiently familiar with the work of other eminent men in the field, then he can read such a book with profit.

In the opening chapter these authors define their terms and indicate their own opinions relative to the pathogenesis of atherosclerosis. Next, they discuss the large amount of information on human atherosclerosis; the apparent effects of diet, disease, and race on this condition. They consider the low-fat, low-cholesterol diet in humans and indicate that considerable further work must be done before the details of the relationship can be ascertained. The authors make one critical point, namely that the actual blood levels of cholesterol may not be as important as the quantity that the body must transport, turn over, and metabolize.

In a discussion of atherosclerosis and the plasma lipoprotein complex, present knowledge is summarized and modes of investigation outlined that may be used in the future. A long chapter is devoted to experimental atherosclerosis. The authors state that the literature on experimental atherosclerosis is not completely covered; rather the senior author's ten years' experience, principally using chicks as an experimental animal. However, the results of many other investigators are described and commented on. In the concluding chapter, the authors very briefly summarize their opinion and their expectations for the future.

This book is well organized and contains a total of 713 references. The tables and graphs are simple but effective, and the descriptions of experimental work are adequate. Those engaged in experimental work should consult the original papers for methods. This book is recommended to the many physicians who are interested in the atherosclerosis problem, but who are not engaged in its investigation.—*Comdr. R. C. Parker, Jr., MC, USN*

THE RADIOLOGY OF BONES AND JOINTS, An Introduction to the Study of Tumours and other Diseases of Bone, by *James F. Brailsford,* M. D., Ph. D. 5th edition. 875 pages; with over 725 illustrations. The Williams & Wilkins Co., Baltimore, Md., 1953. Price $19.

The previous four editions of this volume have been used widely as an authoritative reference text by those concerned with the roentgenographic appearance of the component parts of the skeletal system in their normal and abnormal states. With this background it is reasonable to expect that the fifth edition will continue to enjoy the popularity of its predecessors. Although the fourth edition, published in 1948, is not obsolete, the appearance of the latest work is justified on the necessity for reviewing the progress during the past 5 years and bringing the older work up to date. However, the new edition does more than this because it reflects dynamic concepts of bone disease by a person with a vast and extensive experience in this field.

The material, as in previous editions, is classified according to its anatomic location. Excellent descriptions of normal radiographic appearances together with the normal variations of each part are given. The many pathologic conditions are comprehensively listed and adequately discussed under the pertinent heading of bone and joint involved. The author stresses the importance of serial radiography, with careful observation and correlation with clinical, histologic, and biochemical findings.

Some of the dogmatic expressions of earlier editions have given way to less positive statements modified by such phrases as "may," "appear to," and "relatively common." Among the new subjects covered are Camurati–Engelmann's dystrophy, chrondroblastoma, diastematomyelia, and vitamin poisoning. The roentgenographic features of bone tumors are discussed in great detail, and particular emphasis is directed toward the radiographic signs of malignancy. The author's well-known opposition to the use of biopsy as an aid to diagnosis is expressed vehemently. This view, however, has not won wide acceptance. In this country, the feeling generally prevails that the risk of anesthesia is minimal, that cutting into the tumor does not deleteriously affect its subsequent course, and that histologic study will yield more convincing information than that resulting from serial radiography alone.

The text is easy to read, the format attractive, and the illustrations show excellent detail and are a definite improvement over those of the fourth edition. The scope of the text is so comprehensive that those who study bone and joint roentgenograms, particularly roentgenologists and orthopedic surgeons, will recognize the new edition as a dependable companion.

—Col. H. L. Berman, MC, USA

PSYCHOTHERAPY, Theory and Research, by *O. Hobart Mowrer*, Ph. D., and 21 contributors. 700 pages; illustrated. The Ronald Press Co., New York, N. Y., publishers, 1953.

This volume on psychotherapy is arranged in the form of a symposium divided into two major sections, and the various contributions are written by psychologists who are prominent in the field of clinical investigation and research.

The first section is devoted to the theory, concepts, and application of psychotherapy. There is an inevitable overlapping of the subject material as each writer defines his concept and objectives of psychotherapy. All are in agreement, however, in considering psychotherapy as a learning process which attempts to free the patient from the ineffective or inhibiting behavioral patterns of the past so that he can more fully know himself as a person and thus lead a more effective and satisfactory existence. Emphasis is placed on the cultural causes for anxiety. A position contrary to the Freudian concept of neurosis is presented. The view that "psychotherapy is conceived as a resocialization process by which the patient learns a new comfort reaction to replace his anxiety reaction to his own impulses" is reiterated.

The second section reports research in methods and results of psychotherapy. Research is described which correlates the progress of psychotherapy in patients as indicated by their anxiety or tension. This involves the principle of sorting, palmar sweating and several physiologic changes measured by the lie detector. The results obtained seem to warrant preliminary favorable conclusions.

While this book is verbose and repetitious in parts, and the statistical results are difficult to follow, it is thought-provoking, indicative of fresh and realistic viewpoints, and reports research methods which have promise. For these reasons it is highly recommended to psychiatrists interested in psychotherapy, particularly because the concepts and findings of the psychologist in this field are seldom encountered in the usual psychiatric journals and texts.—*Col. A. J. Glass, MC, USA*

THE PHYSICS OF RADIATION THERAPY, by *Harold Elford Johns*, M. A., Ph. D., edited by *Milton Friedman*, M. D. 286 pages; illustrated. Charles C. Thomas, Publisher, Springfield, Ill., 1953. Price $8.50.

This textbook on physics of radiation therapy presents the subject matter in a logical, interesting, concise manner and complete enough for the needs of the practicing radiotherapist. The early chapters discuss the basic physics of atomic and electromagnetic radiations in a way that will provide residents in radiology with a solid foundation for their clinical work in radiation therapy. The figures and graphs add clarity to the subject matter. The chapters on radiation distribution and energy absorption are

very thought-provoking and are presented from the standpoint of clinical practice of radiation therapy. Two chapters are devoted to the properties and use of radium. A few examples of multiple field technics and clinical applications of radium which point out the basic principles of these methods of therapy are given. A chapter on high energy devices and artificial radioactivity covers the basic physics of these agents. The appendix contains commonly used depth dose tables and isodose curves.

This book is highly recommended, especially for residents in radiation therapy.—*Col. R. J. Healy, MC, USA*

TEXTBOOK OF COLLEGE HYGIENE, by *Oliver E. Byrd,* Ed. D., M. D. 443 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1953.

The preface states that the book is based on the health interests and the health needs of a large number of college undergraduates. It contains 30 chapters covering such subjects as health in marriage, pregnancy and childbirth, infant and child care, mental health and emotional problems, nutrition, overweight, alcohol and narcotics, care of the eyes, care of the teeth, communicable diseases, immunizations, high blood pressure, heart disease, cancer, and accidents. Each chapter is followed by five questions and several references for additional reading. In the Teacher's Manual, which can be procured with the book, the author states that "the textbook can be a foundation for the entire course or it may be considered strictly as a supplement." It would probably best serve the latter purpose because the subjects covered do not constitute a well rounded course in college hygiene.

The book's chief defect is that such fundamentals of hygiene as anatomy, physiology, and immunology have been neglected in favor of the "functional and public health approach." The chapters on mental and emotional problems are judged the best in the book and deserve more coverage than the 40 pages given them. Twenty percent of the text is devoted to alcohol, tobacco, and narcotics, but first aid for traumatic injuries and other common emergencies is hardly mentioned. Some of the information is too detailed or technical for the average college student. It is doubtful if he will profit anything by knowing that "paraldehyde, hyoscine, hydrobromide, chloral hydrate, sodium bromide are effective in relieving the acute symptoms of mentally ill patients," that "dibenamine reverses the exciting effect of adrenalin," or that "the FPM or filter-paper microscopic test and the Chediak blood test are examples of the newer tests for syphilis."

In general the book will serve as a compact ready source for collateral reading for a college hygiene course. It, however, gives the impression of having been hurriedly assembled and written.—*Col. H. A. Schulze, USAF (MC)*

BACTERIAL GENETICS, by *Werner Braun*, Ph. D. 238 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1953. Price $6.50.

This book presents the important principles of bacterial genetics and provides a basis for evaluation of the relationship between this comparatively new field and certain aspects of applied bacteriology. Instead of attempting an exhaustive bibliography, the author uses a limited number of references to direct the reader to the important aspects of bacterial genetics and as a guidance to other pertinent publications.

The text is divided into 13 chapters under headings that follow an orderly development of the subject matter from a description of fundamental genetic principles to a discussion of the relationship between bacterial genetics and certain general bacteriologic problems. Most of the essential concepts concerned with bacterial genetics are given consideration adequate for beginners in the field. The book provides concise, well-presented information which represents achievement of the objectives set forth by the author.

The volume is attractively bound, and contains an informative table of contents and a useful index. This outline of bacterial genetics should serve well in providing a background for students and a reference source for seasoned investigators.

—*Comdr. L. A. Barnes, MSC, USN*

MANUAL OF MEDICAL EMERGENCIES, by *Stuart C. Cullen*, M. D., and *E. G. Gross*, M. D. 2d edition. 278 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1953. Price $4.50.

This is a new edition of a pocket-sized, well-organized volume which deals comprehensively with the principal medical emergencies. It is clearly written and has an excellent format. The authors present broad physiologic concepts of management on rational and common-sense basis and show admirable restraint in not permitting the text to become overly detailed. The chapters on "Airway and Artificial Respiration" and on "Oxygen Therapy," and the recurring emphases on these topics throughout the volume, are of particular value. The chapter on "Head Injuries" is a masterpiece in its development of a logical, physiologic, and sequential approach to this common and frequently mishandled emergency. A series of well-drawn and amusing cartoons impressively delineates the management of local anesthetic drug reactions, and should be of particular interest to dentists. The use of the newer preparations, such as n-allylnormorphine, vitamin K_1, and norepinephrine is adequately covered.

This volume is highly recommended as standard equipment in the physician's bag, and would provide a most useful adjunct to the equipment in the receiving ward of every dispensary and hospital.—*Lt. Comdr. R. K. Moxon, MC, USN*

ELECTRICAL METHODS OF BLOOD-PRESSURE RECORDING, by *Frank W. Noble,* M. E. E. 56 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $3.

This volume presents a technical discussion of the hydraulic and electric systems which have been used in diaphragm-type manometers for recording blood pressure. The characteristics and limitations of the various methods are discussed and the author concludes that the most sensitive and theoretically best transducer is of the variable capacitance type.

The chief value of the text is to acquaint the research worker in cardiovascular diseases with the inherent limitations of various types of instruments used in recording blood pressure.

—*Lt. Col. W. J. Walker, MC, USA*

ATOMIC WEAPONS IN LAND COMBAT, by *G. C. Reinhardt,* Col., C. E., USA, and *W. R. Kintner,* Lt. Col., Inf., USA. 182 pages; illustrated. The Military Service Publishing Co., Harrisburg, Pa., 1953. Price $3.95.

This up-to-the-minute study of the role of the Army in atomic weapons warfare will enrich the library of anyone interested in the evolution of future military science and tactics as influenced by the atomic age. The authors have ably accomplished their purpose of providing a thought-stimulating preview and analysis of the important problems that will face all echelons of command in planning for and carrying out tactical atomic warfare. Writing chiefly from the point of view of the division commander and his staff, the authors nevertheless extend their explorations down command to regimental level and up echelon through corps and army and on to the relationship of the Air Force and the Navy, to provide a comprehensive picture.

After an introductory lesson in the known atomic bomb effects superimposed on typical Ground Force combat situations, the reader progresses to the basic problems of offensive tactics. Training, the crucial problems of command, exploitation of the atomic attack, and logistics and communications in atomic warfare are subjects of special emphasis. The chapter on training covers details of individual and equipment vulnerability, the medical aspects of atomic warfare, and means of protection. The often overemphasized radiation hazard is placed in its true relationship with other hazards of atomic weapons. Dispersion, mobility, communications, and the foxhole take on a new significance.

One gains the conviction that although the tactical atomic weapon challenges our military leaders with a staggering load of new problems in training, organization, logistics, medical services, communications, and intelligence operations, if properly employed, it is the key to future success in land combat against numerically superior foes. This book will be of special interest

to student officers and staff planners responsible for integration of the potent new atomic weapons into the tactical doctrine of the Army. It is a valuable orientation study for all military and civilian personnel concerned with offensive and defensive aspects of atomic warfare.—*Col. J. M. Talbot, USAF (MC)*

INTRODUCTION TO PHYSIOLOGICAL AND PATHOLOGICAL CHEMISTRY, by *L. Earle Arnow*, Ph. G., B. S., Ph. D., M. B., M. D. Revised with the assistance of *Marie C. D'Andrea*, R. N., B. S. 4th edition. 508 pages; illustrated. The C. V. Mosby Co., St. Louis, Mo., 1953. Price $3.75. INTRODUCTION TO LABORATORY CHEMISTRY, by *L. Earle Arnow*, Ph. G., B. S., Ph. D., M. B., M. D. Revised with the assistance of *Marie C. D'Andrea*, R. N., B. S. 4th edition. 108 pages; illustrated. The C. V. Mosby Co., St. Louis, Mo., 1953. Price $1.50.

Chapters on atomic energy, the chemistry of blood, and the periodic table have been added to the new fourth edition of this well-known chemistry text for student nurses. Laboratory experiments have been deleted from the present edition and now constitute a small, separate volume entitled *Introduction to Laboratory Chemistry*. Less than half of the text is devoted to a fundamental treatment of inorganic and organic chemistry, intended to equip the student with information indispensable to an understanding of the author's subsequent presentation of selected facts and relationships in physiologic and pathologic chemistry. The chapters on inorganic and organic chemistry are written in a manner consistent with the needs of students who have not taken a secondary school course in chemistry.

The balance of the text concentrates on those facts and understandings in physiologic and pathologic chemistry which can be expected to be of importance to the practicing nurse. The discussion of the nature and intermediary metabolism of lipids, carbohydrates, proteins, and minerals, and the chemistry of the digestive tract, hormones, vitamins, and nutrition is consistent with the nurse's practical needs. The chapters on blood and urine are effectively written. Typical laboratory findings generally associated with a broad spectrum of well-defined clinical states are presented with clarity and appropriateness. In this respect, the text promises to serve the student nurse as a valuable reference, long after graduation.

The laboratory manual includes 144 discrete experiments which provide the student and instructor alike with a wide selection of laboratory learning experiences designed to parallel the material presented in the text. All of the experiments would appear to be within the scope of students with no prior course in chemistry. Those experiments which are intended as demonstrations are clearly indicated.

—*Lt. Col. T. J. Domanski, USAF (MSC)*

A HISTORY OF PSYCHOANALYSIS IN AMERICA, by *C. P. Oberndorf*, M. D., 280 pages. Grune & Stratton, Inc., New York, N. Y., 1953. Price $5.

This book, written from a personal background, is an account of the development of psychoanalytic psychiatry and its practice in America, from its first serious clinical application in the Manhattan State Hospital in 1909. The first two chapters give an account of the precursors of Freud's thinking in Europe and the anticipation of his thinking among novelists and other writers. These serve as a background for the introduction of psychoanalytic theory in America, culminating in the wide validation of psychoanalysis after Freud delivered a series of five lectures "On Psychoanalysis" at Clark University in September 1909.

Thereafter, the book assumes a more personal aspect as the author traces the trials and tribulations of psychoanalysis, both as a science and art, through his experiences as an active and leading participant in psychoanalytic affairs for more than 40 years. The author has fulfilled his purpose of presenting "in interesting narrative form the main facts of the development of psychoanalysis as I have seen them during this period and shall add only such details about myself as are necessary to enable the listener to have some idea of the background and preparation and outstanding tastes of the persons through whom the story is presented."

The book furnishes interesting and informative reading, not only for psychoanalysts and analytically oriented psychiatrists, but also for the many others in related branches of medicine and science whose lives have been changed and enriched through the application of Freud's discoveries.

—*Lt. Col. A. L. Brown, MC, USA*

COMPRESSION ARTHRODESIS, Including Central Dislocation as a Principle in Hip Surgery, by *John Charnley*, F. R. C. S. 264 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md., 1953. Price $8.50.

This monograph is a vigorous exposition of the author's theories on compression arthrodesis, namely that in the healing of cancellous bone maximum osteogenesis takes place at the site of maximum pressure. A distinction is made between the healing of cancellous bone and cortical bone, and most of a chapter is spent in refuting Eggers' work on the concept of a "contact-compression factor" in the healing of fractures in cortical bone. Another chapter is devoted to a rebuttal of Watson-Jones' denunciation of the Charnley theory of the use of mechanical compression in osseous union.

Nevertheless, the book makes interesting reading. It is well written and the illustrations are excellent. The technic of compression arthrodesis of all the major joints is described in detail and illustrative case histories are given. The author's experience

with each of the various procedures is tabulated. An especially interesting section is that on compression arthrodesis of the hip, in which a technic of central dislocation of the hip with an internal spring compression is described.

Not all orthopedic surgeons will agree with the author's theories, but they will profit by reading this original and stimulating work.—*Comdr. W. H. Gulledge, MC, USN*

LECTURE NOTES ON THE USE OF THE MICROSCOPE, by *R. Barer*, M. A., M. B. 76 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $2.

In the preface of this monograph the author cites the need in English education for a brief course of instruction in the use of the microscope, and mentions that his formal training in this regard was a 10-minute chat concerning the oil immersion objective by his enthusiastic professor of bacteriology. He discussed the optical principles involved, which are simplified for the benefit of the beginner, and gives practical instructions on use and care of the microscope. The illustrations are simple and clear and the index is excellent. The bibliography is limited to five similar articles.

This small volume is very similar in style to those furnished by American microscope manufacturers with their products, but the latter are more complete and the illustrations are far superior. Because formal training in the use of the microscope is usually given students in American schools, this book is of limited value in this country.—*Lt. Comdr. A. Raftery, MC, USN*

THE ALLERGIC PATIENT AND HIS WORLD, Including Sources of Allergens, by *Florence Eastty Sammis*, M. D. American Lecture Series, Publication No. 157. 156 pages. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $4.75.

This small text is written for the allergic patient. The format is well laid out and it is excellently written. It enables the patient to better co-operate in many important instructions given him and should, therefore, save the physician much time and make his advice more comprehensive to the patient. Many tips are given to the housewife on cooking and preparing the diets necessary for the allergic patient, and there is an excellent chapter on the modus operandi of elimination diets. Another chapter shows distribution of pollens and the pollinating seasons of the plants. Photographs of plants are included which are of special interest to the pollen-sensitive patient. I would recommend this book to all allergic patients.—*Lt. Col. A. J. Berger, MC, USA*

NEW BOOKS

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

DIAGNOSIS OF ACUTE ABDOMINAL PAIN, by *William Requarth,* M. D., Clinical Assistant Professor of Surgery, University of Illinois College of Medicine. Foreword by *Warren H. Cole,* M. D. 243 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1953. Price $5.

SALMONELLAE AND SHIGELLAE, Laboratory Diagnosis Correlated With Clinical Manifestations and Epidemiology, by *Alfred J. Weil,* M. D., Department of Bacteriology, The Bronx Hospital, New York, N. Y., and *Ivan Saphra,* M. D., Department of Bacteriology, The Beth Israel Hospital, New York, N. Y. 247 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $7.75.

SPATIAL VECTORCARDIOGRAPHY, by *George E. Burch,* M. D., F. A. C. P., Henderson Professor of Medicine, Tulane University School of Medicine, Physician-in-Chief, Tulane Unit, Charity Hospital of Louisiana at New Orleans, Consultant in Cardiovascular Diseases, Ochsner Clinic, Visiting Physician, Touro Infirmary, New Orleans; *J. A. Abildskov,* M. D., Instructor in Medicine, Tulane University School of Medicine, Assistant Visiting Physician, Tulane Unit, Charity Hospital of Louisiana at New Orleans; and *James A. Cronvich,* M. S., Professor of Electrical Engineering, Tulane University, College of Engineering, New Orleans. 173 pages; with 121 illustrations. Lea & Febiger, Philadelphia, Pa., 1953. Price $5.

ESSENTIALS OF NURSING, by *Helen Young,* R. N., Director Emeritus of Nursing, The Presbyterian Hospital of the City of New York, and *Eleanor Lee,* A. B., R. N., Assistant Professor of Nursing, Department of Nursing, College of Physicians and Surgeons, Columbia University. Edited by *Helen F. Pettit,* R. N., M. A., Assistant Professor of Nursing (Nursing Arts), Department of Nursing, Faculty of Medicine, Columbia University. Associate Editor: *Ruth A. Lynch,* M. A., R. N., Instructor in Nursing, Department of Nursing, Faculty of Medicine, Columbia University. Foreword by *Eleanor Lee,* A. B., R. N., Acting Executive Officer Department of Nursing, Faculty of Medicine, Columbia University. 527 pages; illustrations and line drawings by *Helen B. Pristop.* G. P. Putnam's Sons, New York, N. Y., 1953. Price $4.

PHYSIOLOGY OF THE EYE, Clinical Application, by *Francis Heed Adler,* M. A., M. D., F. A. C. S.; *William F. Norris;* and *George E. de Schweinitz,* Professor of Ophthalmology, School of Medicine, University of Pennsylvania, and Consulting Surgeon, Wills Hospital, Philadelphia. 2d edition. 734 pages; with 329 illustrations including 3 in color. The C. V. Mosby Co., St. Louis, Mo., 1953. Price $13.

PREGNANCY WASTAGE, Proceedings of a Conference Sponsored by the *Committee on Human Reproduction, National Research Council,* in behalf of the *National Committee on Maternal Health, Inc.* Edited by *Earl T. Engle.* 254 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $8.50.

HYPERTENSIVE DISEASES, Causes and Control, by *Henry A. Schroeder,* M. D., F. A. C. P., Associate Professor of Medicine and Director, Hypertension Division, Department of Internal Medicine, Washington University School of Medicine; Assistant Physician, Barnes Hospital, St. Louis, Mo. With Contributions from *Gregory S. Gressel,* M. D.; *Dean F. Davies,* Ph. D., M. D.; *H. Mitchell Perry, Jr.,* M. D.; and *Donald F. Gibbs,* M. B. Ch. B., M. R. C. P. (Edin.). 610 pages; 164 illustrations and 3 colored plates. Lea & Febiger, Philadelphia, Pa., 1953. Price $10.

SURGERY OF REPAIR AS APPLIED TO HAND INJURIES, by *B. K. Rank,* M. S. (Melbourne), F. R. C. S. (England), F. R. A. C. S.; Honorary Plastic Surgeon, Royal Melbourne Hospital; Visiting Plastic Surgeon, Repatriation Commission, Victoria; Consulting Plastic Surgeon, Ministry of Health in Tasmania, and *A. R. Wakefield,* M. S. (Melbourne), F. R. C. S. (England), F. R. A. C. S.; Honorary Plastic Surgeon, Children's Hospital, Melbourne; Honorary Assistant Plastic Surgeon, Royal Melbourne Hospital; Visiting Plastic Surgeon, Repatriation Commission, Victoria. Foreword by Sir *Gordon Gordon-Taylor,* K. B. E., C. B., LL. D., Sc. D., F. R. C. S., F. R. C. S. (Ed.), F. R. A. C. S., F. A. C. S., F. R. C. S. (Canada). 256 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md., 1953. Price $8.

PLANNING GUIDE FOR RADIOLOGIC INSTALLATIONS, by the *Committee on Planning of Radiologic Installations of the Commission on Public Relations of the American College of Radiology; Wendell G. Scott,* M. D., Chairman. 336 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1953. Price $8.

THE YEAR BOOK OF PEDIATRICS (1953-1954 Year Book Series), edited by *Sydney S. Gellis,* M. D., Assistant Professor of Pediatrics, Harvard Medical School; Senior Physician, Children's Medical Center, Boston; Pediatrician-in-Chief, Beth Israel Hospital, Boston. *Isaac A. Abt,* M. D., Editor Emeritus. 435 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1953. Price $6.

HYPNOTISM, AN OBJECTIVE STUDY IN SUGGESTIBILITY, by *André M. Weitzenhoffer.* 380 pages. John Wiley & Sons, Inc., New York, N. Y., 1953. Price $6.

RESUSCITATION OF THE NEWBORN, by *Joseph D. Russ,* M. D., F. A. A. P., Assistant Professor of Pediatrics, Tulane University School of Medicine, Senior Pediatrician Touro Infirmary, New Orleans, La. American Lecture Series (R), Publication Number 193, A Monograph in American Lectures in Anesthesiology, edited by *John Adriani,* M. D., Director, Department of Anesthesia, Charity Hospital, New Orleans, La. 55 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $2.50.

PHYSIOLOGICAL CARDIOLOGY, by *Arthur Ruskin,* M. D., F. A. C. P., Associate Professor of Internal Medicine, University of Texas—Medical Branch, Galveston, Tex. American Lecture Series (R), Publication Number 184, A Monograph in The Bannerstone Division of American Lectures in Physiology, edited by *Robert F. Pitts,* M. D., Ph. D., Professor of Physiology and Biophysics, Cornell University Medical College, New York, N. Y. 370 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $8.

THE DISPOSAL OF THE DEAD, by *C. J. Polson,* M. D. (Birm.), F. R. C. P. (Lond.), Barrister-at-Law, Professor of Forensic Medicine, University of Leeds, *R. P. Brittain,* M. A., B. Sc., M. B., Ch. B., B. L., LL. B. (Glasgow), Senior Lecturer in Forensic Medicine, University of Leeds; and *T. K. Marshall,* M. B., Ch. B. (Leeds), Lecturer in Forensic Medicine, University of Leeds. Edited by *C. J. Polson.* 300 pages. Philosophical Library, Inc., New York, N. Y., 1953. Price $7.50.

DISEASES OF WOMEN, by *Robert James Crossen,* A. B., M. D., F. A. C. S., Assistant Professor of Clinical Gynecology and Obstetrics, Washington University School of Medicine; Section Head of Unit I Obstetrics and Gynecology, St. Louis City Hospital; Assistant Gynecologist and Obstetrician to Barnes Hospital and St. Louis Maternity Hospital; Assistant Gynecologist to St. Louis Children's Hospital; Gynecologist and Obstetrician to St. Luke's Hospital; Member of American Academy of Obstetrics and Gynecology, Central Association of Obstetricians and Gynecologists, American Radium Society, American Society for the Study of Sterility, International Fertility Association; Diplomate of the American Board of Obstetrics and Gynecology. 10th edition. 935 pages; 990 illustrations including 41 in color. The C. V. Mosby Co., St. Louis, Mo., 1953. Price $18.50.

THE DIGESTIVE TRACT IN ROENTGENOLOGY, Volumes I and II, by *Jacob Buckstein,* M. D., Assistant Professor of Clinical Medicine, Cornell University Medical College; Visiting Roentgenologist (Alimentary Tract Division), Bellevue Hospital, New York, N. Y.· Attending Gastroenterologist, Beth David Hospital, New York, N. Y.; Consultant to the Central Islip State Hospital, New York; Norwalk General Hospital, Norwalk, Conn.; Good Samaritan Hospital, Suffern, N. Y.; Formerly Consultant in Gastroenterology to the U. S. Public Health Service and the U. S. Veterans Bureau. 2d edition. Volume I, 544 pages; Volume II, 658 pages; 1,534 illustrations in 897 figures. J. B. Lippincott Co., Philadelphia, Pa., 1953. Price $30 set.

MOTHER AND BABY CARE IN PICTURES, by *Louise Zabriskie,* R. N., Director, Maternity Consultation Service, New York, N. Y.; Formerly Lecturer, New York University; Night Supervisor, Lying-in-Hospital, New York, N. Y.; Field Director, Maternity Center Association, New York, N. Y. 4th edition. 244 pages; 255 figure numbers and 11 tables. J. B. Lippincott Co., Philadelphia, Pa., 1953. Price $3.

REVIEW OF PHYSIOLOGICAL CHEMISTRY, by *Harold A. Harper,* Ph. D., Professor of Biochemistry, University of San Francisco; Lecturer in Surgery, University of California School of Medicine, San Francisco; Biochemist Consultant to Metabolic Research Facility, U. S. Naval Hospital, Oakland; Biochemist Consultant to St. Mary's Hospital, San Francisco. 4th edition. 328 pages; illustrated. Lange Medical Publications. University of Medical Publishers, P. O. Box 1215, Los Altos, Calif., 1953. Price $4.

NASH'S SURGICAL PHYSIOLOGY, New Second Edition. The first edition was written by *Joseph Nash,* M. D., Late Assistant Professor of Clinical Surgery, New York University College of Medicine, Associate Visiting Surgeon, Bellevue Hospital, New York, N. Y.; the second edition was revised and edited by *Brian Blades,* M. D., Professor of Surgery, George Washington University School of Medicine; with the collaboration of *Edward J. Beattie, Jr.,* M. D.; *Leon Gerber,* M. D.; *Walter H. Gerwig, Jr.,* M. D.; *Ernest A. Gould,* M. D.; *Alec Horwitz,* M. D.; *Vincent M. Iovine,* M. D.; *Gordon Letterman,* M. D.; *William S. McCune,* M. D.; *William C. Meloy,* M. D.; *Hugo V. Rizzoli,* M. D.; and *Jacob J. Weinstein,* M. D., all of The George Washington University School of Medicine. 686 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $12.50.

FRONTAL LOBES AND SCHIZOPHRENIA, Second Lobotomy Project of Boston Psychopathic Hospital, edited by *Milton Greenblatt,* M. D., Assistant Clinical Professor in Psychiatry, Harvard Medical School, and Chief of Laboratories and Research, Boston Psychopathic Hospital; and *Harry C. Solomon,* M. D., Professor of Psychiatry, Harvard Medical School, and Medical Director, Boston Psychopathic Hospital. 425 pages; illustrated. Springer Publishing Co., Inc., New York, N. Y., 1953. Price $12.50.

AUTOPSY DIAGNOSIS OF CONGENITALLY MALFORMED HEARTS, by *Maurice Lev,* M. D., Pathologist and Chief of Research Laboratories, Mount Sinai Hospital of Miami, Miami Beach, Fla.; Associate Professor of Pathology, University of Miami, School of Medicine, Coral Gables, Fla.; Formerly, Associate Professor of Pathology, University of Illinois College of Medicine, Chicago, Ill.; Formerly, Assistant Professor of Pathology, Creighton University School of Medicine, Omaha, Nebr. 194 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1953. Price $7.50.

THE GREEN AND RED PLANET, A Physiological Study of the Possibility of Life on MARS, by *Hubertus Strughold,* Professor of Aviation Medicine, Head of Department of Space Medicine, U. S. Air Force School of Aviation Medicine, with editorial assistance and a foreword by *Green Peyton.* 107 pages; illustrated. The University of New Mexico Press, Albuquerque, New M., 1953. Price $4.

THE YEAR BOOK OF RADIOLOGY (1953-1954 Year Book Series); Radiologic Diagnosis, edited by *John Floyd Holt,* M. D., Associate Professor, Department of Roentgenology, University of Michigan, and *Fred Jenner Hodges,* M. D., Professor and Chairman, Department of Roentgenology, University of Michigan; Radiation Therapy, edited by *Harold W. Jacox,* M. D., Professor of Radiology, College of Physicians and Surgeons, Columbia University; Chief, Radiation Therapy Division, Radiologic Service, Presbyterian Hospital, New York, N. Y., and *Vincent P. Collins,* M. D., Professor and Chairman, Department of Radiology, Baylor University, College of Medicine; Radiologist-in-Chief, Jefferson Davis Hospital, Houston, Tex. 462 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1953. Price $8.

GROWTH OF PROTOZOA, by *S. H. Hutner* and *William Trager.* Originally published in Annals of the New York Academy of Sciences, Volume 56, Article 5, pages 815-1094, October 14, 1953. Illustrated. The New York Academy of Sciences, New York, N. Y., 1953. Price $4.50.

THE RELATION OF LEAN BODY WEIGHT TO METABOLISM AND SOME CONSEQUENT SYSTEMATIZATIONS, by *Albert R. Behnke,* Medical Research Laboratory, United States Submarine Base, New London, Conn. Originally published in Annals of the New York Academy of Sciences, Volume 56, Article 6, pages 1095-1142, November 17, 1953. Illustrated. The New York Academy of Sciences, New York, N. Y., 1953. Price $1.25.

THE PSYCHIATRIST: HIS TRAINING AND DEVELOPMENT, Report of the 1952 Conference on Psychiatric Education held at Cornell University, Ithaca, N. Y., June 19-25, 1952. Organized and conducted by the *American Psychiatric Association* and the *Association of American Medical Colleges.* Editorial Board: *John C. Whitehorn,* M. D., Chairman; *Francis J. Braceland,* M. D.; *Vernon W. Lippard,* M. D.; and *William Malamud,* M. D. Editorial Assistants: *Stella Bloch Hanau* and *Robert L. Robinson.* 214 pages; illustrated. American Psychiatric Association, Washington, D. C., 1953.